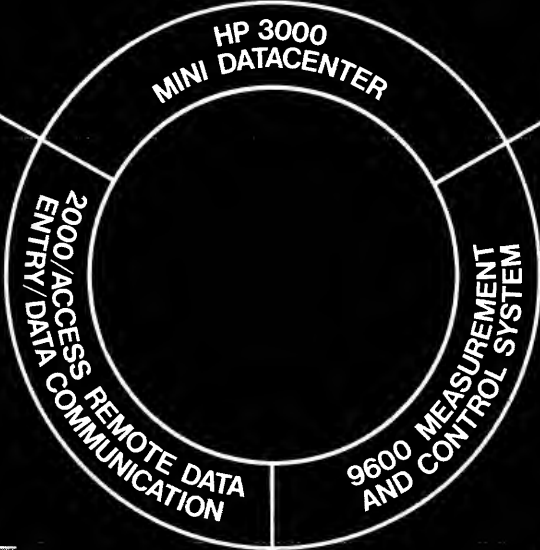


ISSUE 3  
OCTOBER 15, 1975

# computer systems COMMUNICATOR



HP 3000  
MINI DATACENTER

2000/ACCESS REMOTE DATA  
ENTRY/DATA COMMUNICATION

9600 MEASUREMENT  
AND CONTROL SYSTEM

3000

**HEWLETT-PACKARD  
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Printed 10/75

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## INSTRUCTIONS FOR ORDERING COMMUNICATOR

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Customers who do not have Software Service Contracts may purchase Mail-Order Subscriptions through HP's Direct Mail Order System.

---

### A. MAIL-ORDER SUBSCRIPTION(S)

1. Complete name and address portion of ORDER FORM.
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  - b) \_\_\_\_\_ Additional Subscriptions\*  
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  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
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\$ \_\_\_\_\_

Prorate the dollar amount to make the ADDITIONAL SUBSCRIPTIONS EXPIRE WITH YOUR Software Service Contract. (SEE TABLE)

\_\_\_\_\_

  - c) Total Order Amount (a + b) \$ \_\_\_\_\_
  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
3. Forward ORDER FORM to your local HP Customer Engineering Representative. Your order will be approved and forwarded to the appropriate department. You will be billed for any ADDITIONAL SUBSCRIPTIONS by your local HP office.

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### C. SPECIAL INSTRUCTIONS FOR INTERNATIONAL CUSTOMERS

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1. International customers who do not have Software Service Contracts are encouraged to use HP's Direct Mail Order System by remitting a bank draft in U.S. dollars according to the ordering procedures outlined in Instruction A above. Optionally, international customers may purchase the **Communicator** through their local HP Sales and Service Office. The customer should contact his HP Office for the subscription prices in the currency of his country, then complete the Order Form and forward it together with payment to his local HP Customer Engineering Department.

1. International customers with Software Service Contracts should follow the ordering procedure outlined in Instruction B above. If the customer wishes to purchase ADDITIONAL SUBSCRIPTIONS, he should contact the local HP Office for the subscription price in the currency of his country, then submit the ORDER FORM. The customer will be billed for ADDITIONAL SUBSCRIPTIONS by his local HP Office.

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\*All ADDITIONAL SUBSCRIPTIONS will be sent to the same address as the BASE SUBSCRIPTION.

# editor's note

Effective August 1, 1975 Hewlett-Packard Company's Computer Systems Group established two new divisions as the result of recent growth and successful expansion of its product line.

The newly established divisions are the General Systems Division, responsible for HP 3000 systems and HP 2000 Access systems with emphasis on business and educational applications, and the Terminal Products Division, responsible for HP 2640 microprocessor-equipped CRT terminals and subsequent terminal products. The Data Systems Division continues as the largest of HP's computer operations with responsibility for HP 21MX minicomputers, 9600 systems, discs and related products for the industrial and OEM markets.

Paul C. Ely, Jr., general manager, said "The success of the HP 3000 mini data center system and the new HP 2640 CRT terminal has greatly increased our opportunities. The new organization will enable us to concentrate more management attention to these products as well as to our more traditional industrial, scientific and OEM areas."

The **Computer Systems Communicator** continues as a "group" publication, devoted to keeping all of our computer products customers up-to-date on currently available software and documentation, programming tips, training schedules and ordering information for their particular application.

The **Communicator** is again divided into three separate sections for easy reference. The first section contains information relative to HP 2000 Computer series, the second section is devoted to HP 9600/9700 systems, and the final section relates to HP 3000 Computer products.

This is the last of the three Preview Issues of the **Communicator**. Subsequent issues will be delivered only to customers who have purchased a subscription or who have ordered a free subscription under the provisions of their Software Service Contract. See Subscription Information on page 143 for details.

We hope you have found this information useful and will elect to continue receiving the **Communicator**. Let us know the kinds of articles you would like to see in upcoming issues..your comments and suggestions are welcome. Address correspondence to:

Editor  
Computer Systems Communicator  
HP General Systems Division  
Product Support  
11000 Wolfe Road  
Cupertino, California 95014



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information

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# software tips

## USING IMAGE/2000

### QUERY

When using the UPDATE A command to add entries to a data set, be alert to the following special characters:

!, (,), :, <, >, [, /, ], ↑, ←

If a data item value contains one of these characters, the value must be enclosed in quotes when entered. If it is not, QUERY enters only the special character into the data item space.

### DATA BASE MANAGEMENT SYSTEM (DBMS)

The following information should be added under paragraph 8-4 of the IMAGE/2000 Reference Manual (24376-90001):

To load a user-written FORTRAN or Assembly program which makes calls to DBMS, enter the following through the terminal:

Name, DBMSL, DBHL, DBLIB, SAMPL,/E

Where:

Name = User Program  
DBMSL = Data Base Management Routine  
DBHL = Data Base Management Hashing Routines  
DBLIB = Data Base Management Library Routine  
SAMPL = Decimal String Arithmetic Routines

*Marilyn Branthwaite  
HP Cupertino*

## 2000 ACCESS UTILITY ROUTINES

Two utility routines named DTTIM and SCAN have been put to good use in the development of HP 2000 Access programs. Although these are not HP supported programs, descriptions and listings are included for your interest and possible use.

### The DATTIM Program (A Subroutine to Print Date and Time)

DATTIM is a subroutine, occupying lines 9100 through 9154. To incorporate DATTIM into your program, simply Append it to your program. You will need an END statement somewhere past 9154 before your program will be runnable.

To use DATTIM, simply perform a GOSUB 9100 whenever you want the current date and time printed out. The date and time will be returned in the string ZO\$. The calling program can then print and/or save ZO\$ as it chooses.

*Anna Holland*

```
DATTIM
9100 REM SUBROUTINE 9100, PRINTS DATE AND TIME
9101 REM VERS J, 10 JULY 75--RETURNS DATE IN ZO$
9102 DIM Z$(15),Z(12),ZO$(35)
9103 Z0=TIM(0)
9104 Z1=TIM(1)
9105 Z2=TIM(2)
9106 Z3=TIM(3)
9107 IF Z0#TIM(0) THEN 9103
9108 RESTORE 9106
9109 MAT READ Z(12)
9110 Z4=(Z1>=12)
9111 Z1=Z1-12*Z4
9112 Z1=Z1+12*(Z1=0)
9113 CONVERT Z1 TO ZO$
9114 ZO$(LEN(ZO$)+1)=":"
9115 IF Z0>=10 THEN 9117
9116 ZO$(LEN(ZO$)+1)="0"
9117 CONVERT Z0 TO ZO$(LEN(ZO$)+1)
9118 GOSUB 9153
9119 RESTORE 9127
9120 FOR Z8=1 TO Z4+1
9121 READ Z$
9122 NEXT Z8
9123 ZO$(LEN(ZO$)+1)=Z$
9124 GOSUB 9153
9125 Z5=(Z3-73)*365+Z2+INT((Z3-73)/4)
9126 DATA 1,32,60,91,121,152,182,213,244,274,305,335
9127 DATA "A.M.", "P.M."
9128 DATA "JANUARY", "FEBRUARY", "MARCH", "APRIL", "MAY", "JUNE"
9129 DATA "JULY", "AUGUST", "SEPTEMBER", "OCTOBER", "NOVEMBER", "DECEMBER"
9130 DATA "SUNDAY", "MONDAY", "TUESDAY", "WEDNESDAY", "THURSDAY"
9131 DATA "FRIDAY", "SATURDAY"
9132 RESTORE 9130
9133 FOR Z8=0 TO INT((Z5/7-INT(Z5/7))*7)+1)
9134 READ Z$
9135 NEXT Z8
9136 ZO$(LEN(ZO$)+1)=Z$
9137 GOSUB 9153
9138 Z6=(Z2>=60) AND ((Z3/4)=INT(Z3/4))
9139 FOR Z7=12 TO 1 STEP -1
9140 IF Z2>=Z(Z7)+Z6 THEN 9142
9141 NEXT Z7
9142 CONVERT Z2-Z(Z7)+1-Z6*(Z2#60) TO ZO$(LEN(ZO$)+1)
9143 GOSUB 9153
9144 RESTORE 9128
9145 FOR Z8=1 TO Z7
9146 READ Z$
9147 NEXT Z8
9148 ZO$(LEN(ZO$)+1)=Z$
9149 GOSUB 9153
9150 CONVERT Z3+1900 TO ZO$(LEN(ZO$)+1)
9152 RETURN
9153 ZO$(LEN(ZO$)+1)=" "
9154 RETURN
```

### The SCAN Program (A keyword search)

This simple program performs a keyword search for any number of keywords in a program, and prints out all lines found that contain any of the indicated keywords.

Suppose you want to determine whether a particular variable Q\$ is used in a program. Simply provide the keyword "Q\$" to SCAN, and it will find all lines (if any) in your program that contain that keyword.

To use SCAN, first create an ASCII disc file, GET the program that you wish to scan and LIST it to that file. Then run or execute SCAN, give the name of the ASCII file, and reply to the KEYWORD? prompts. A null reply to KEYWORD? indicates that you have no more keywords to specify, and the actual scan follows. All lines containing the

keyword(s) you indicated will be printed out and at the end, the message

END OF SCAN: nnn LINES FOUND.

is printed and the program halts.

Example:

```
GET-IDSF
LIST*OUT=NEW*
EXE-SCAN
SCAN
```

FILENAME? NEW

```
KEYWORD? QS
KEYWORD? Z$
KEYWORD?
```

```
PROGRAM NAME IS IDSF .
3015 Z$=A$(A,A)
3025 IF Z$=Q$(Z5,Z5) THEN 3045
3303 Z$=A$(J2,J2)
3304 IF Z$="%" THEN 3500
3305 IF Z$#"%" THEN 3320
3325 IF Z$="$" THEN 3345
3330 PRINT Z$;
3510 Z$=A$(J2,J2)
3520 IF Z$=Q$(Z5,Z5) THEN 3555
6725 Z$=R$(J-C1,J-C1)
6750 Z$=R$(J+G4,J+G4)
6810 IF Z$=D$(K,K) THEN 6825
9115 ENTER C1,B3,Z$
END OF SCAN; 13 LINE(S) FOUND.
```

DONE

```
SCAN
10 DIM A$(255),B$(255),C$(255)
20 REM SCAN, VERSION 3, 25 APR 75
25 REM MODIFIED FOR USE IN E000
30 REM *
40 FILES **
50 ASSIGN "SCR",2,B0,RR
60 IF NOT B0 THEN 90
70 PRINT "CANNOT PROCEED WITHOUT EXCLUSIVE CONTROL OF SCR--SORRY"
80 STOP
90 PRINT "FILENAME? ";
100 INPUT C$
110 IF LEN(C$)=0 THEN 400
120 ASSIGN C$,1,B0
130 IF B0<3 THEN 160
140 PRINT "CANNOT FIND FILE."
150 GOTO 90
160 P=0
170 IF END #2 THEN 270
180 READ #2,1
190 PRINT
200 PRINT "KEYWORD? ";
210 INPUT B$
220 IF LEN(B$)=0 THEN 290
230 B$=UP$(B$)
240 PRINT #2:B$,END
250 P=P+1
260 GOTO 200
270 PRINT "THE 'SCR' FILE IS FULL--CAN'T TAKE ANY MORE KEYWORDS."
280 GOTO 340
290 IF P THEN 320
300 PRINT "NO KEYWORDS, HENCE NOTHING TO DO..."
310 STOP
320 PRINT CTL(1)
330 Q=0
340 IF END #1 THEN 400
350 INPUT #1:AS
```

```
360 PRINT "PROGRAM NAME IS "AS"."
370 INPUT #1:AS
380 READ #2,1
390 IF TYP(2)#2 THEN 370
400 READ #2:B$
410 IF POS(AS,B$) THEN 430
420 GOTO 390
430 PRINT AS
440 Q=Q+1
450 GOTO 370
460 PRINT "END OF SCAN; "Q"LINE(S) FOUND."
470 PRINT CTL(1)
480 END
```

## RJE ON HP 2000 ACCESS

RJE (Remote Job Entry) is a facility available on many computer systems, allowing them to be connected (usually over telephone lines) to other computers. The typical mode of operation is for several small systems ("satellites" or "workstations") to be connected to a large system (the "Host"). The workstations accept jobs from users, (usually in the form of card decks), and transmit the card images over the telephone line to the host system, where they are run. The resulting output, in the form of printout and/or punched cards, is transmitted by the Host back to the workstation to which it belongs, where it is actually printed and/or punched.

The HP 2000 Access system can act as a workstation to two types of Host systems, IBM or CDC. To IBM, the 2000 Access emulates a HASP multileaving workstation, and to CDC, it emulates a UT200 workstation.

As a HASP workstation, the 2000 Access can support up to 7 card readers, 7 line printers, and 7 punches (the maximum for a HASP workstation). As a UT200, the 2000 Access supports the standard configuration of one card reader and one printer.

Operating in the batch mode of RJE (card decks in, printout back), the 2000 Access can perform RJE duties simultaneously with its operations of timeshare BASIC. The RJE operations have a minimal effect on timeshare response time and throughput, since the RJE operations are given lower priority. (Obviously, though, if an RJE operation is using a card reader(s) and line printer(s), these devices will be unavailable to timeshare users).

The HP 2000 Access system offers another mode of operation that combines the formerly separate RJE and timeshare operations. Instead of going to real devices, the job streams to and from the Host system can be directed by the 2000 Access to BASIC programs. For example, a BASIC user may enter his IBM or CDC job from a timeshare terminal, store it on a 2000 Access disc file, edit it if necessary, and then submit it to the Host system using the 2000 Access RJE supervisor utility, TSP or a simple file copy routine (a 7 line BASIC program will do). From the Host system's point of view, the job stream appears as normal card reader input.

The print and punch output back from the Host system may be directed in a similar manner. Rather than going to a real printer, the job output may be directed to a BASIC program, where it may be listed to the terminal, stored on the 2000 Access disc, or on mag tape, or even serve as input data for the timeshare program!

The last feature of this integration of RJE and BASIC is the ability of a BASIC program to use the RJE console lines. Both HASP and UT200 workstations have an operator's console, where the operator can request the status of his jobs, control their execution, look at the overall activity of the Host system (to get an idea of how busy it is), and contact the Host system operator. On the 2000 Access, the operator's console serves this purpose along with its use as the timeshare system console. In addition, the console lines (one for inquiries and one for the resulting messages) are accessible to BASIC programs. Not only can a user submit jobs from his terminal and receive his output back, but he can also monitor how his job is doing when it is at the Host site.

Admittedly, these functions should not be available to all users, especially the console lines. Just as access to real peripherals can be controlled on an individual account basis by the 2000 Access operator, access to the RJE lines can be allocated as necessary.

In the next issue of the **Communicator**, look for more on RJE, and its Telecommunications Supervisory Package (TSP), what it does, and how it buffers the user from the RJE system.

*Gary Koerzendorfer  
HP Cupertino*

## TCS CAUTION

Special care should be taken when using TCS (Terminal Control System) buffer allocation and the priority scheme at the same time. Consider the following situation:

1. A TCS program has 4 active control blocks and a buffer pool consisting of 3 buffers.
2. All 3 buffers are being used by control blocks doing disc I/O at priority 2.
3. A 4th control block, running at priority 5, requests a buffer. Because all buffers are in use, TCS does a pause for this control block.
4. This pause, with a higher priority than the disc I/O, will be transferred back and forth between the pending queue and the current queue. The disc I/O, even after completion, will never have a chance to release a buffer; thus, this 4th control block will pause indefinitely.

To avoid similar situations, the simplest alternatives are:

1. Initialize additional buffers in the buffer pool.
2. Do all operations involving buffers at the same priority level.

*Marilyn Branthwaite  
HP Cupertino*

# bulletins

## LEARNING TIMESHARE BASIC

"Learning Timeshare BASIC" is a 60-page manual designed to teach the BASIC computer language to beginning data processing students. More than just a dictionary of BASIC vocabulary, the book is a first course in computer programming — instantly incorporating each new word of BASIC into a useful sample application. Enough information is provided for you to become well-versed in HP BASIC, operate a terminal and write simple BASIC programs.

After reading the manual you will know how to sit down at a computer terminal and establish contact with a computer. You will also understand and be able to use subroutines, functions, strings, arrays and files. Flow charting and documenting programs are described and there is a simple explanation of scientific notation.

The text is simple and easy to read so that as a beginner you will not be overawed by computer terminology — and as an experienced programmer you can effortlessly gain an understanding of BASIC.

If your office or school has purchased an HP 2000 Access computer system, you will find this manual a good starting point. Once you have mastered the fundamentals of BASIC presented in this lighthearted text, you can turn to the 2000 Access Reference Manual to learn about the really powerful features that the 2000 Access system provides.

The HP part number is 22687-90009 and the price is \$3.00.

*Ilene Birkwood  
HP Cupertino*

## ENHANCED IMAGE/2000 REFERENCE MANUAL

An extensively revised version of the IMAGE/2000 Data Base Management System Reference Manual is now available.

A description of the TCS (Terminal Control System) and IMAGE interface as well as a quick reference guide have been added as appendices. The quick reference appendix includes syntax and boundary information, and summaries of:

- All Data Base Definition Language statements
- Data Base Utility System commands

- Data Base Management System subroutine calls
- Query System prompts and responses

The HP part number is 24376-90001 and the price is \$11.00.

*Sandy Martensen  
HP Cupertino*

# software updates

## TCS/B UPDATE

TCS/B has been re-released with a date code of 1529. Modifications allow it to work in a 24 subchannel environment, thus making it compatible with DOS III B, date code 1523. Changes were also made to accommodate the card reader driver ACR01.

In addition, known bugs in TCS/B have been corrected:

1. Erroneous priority level sometimes set when one segment called another.
2. Work area writes sometimes writing into system/user area of disc.

Customers who have a TCS Maintenance Agreement or the Subscription Service will automatically receive this update. Others can order a new tape by specifying one of the following part numbers:

24342-10001	TCS/B	800 BPI,	9Track Mag Tape
24342-11001	TCS/B	1600 BPI,	9Track Mag Tape
24342-18001	TCS/B	Paper Tape	
through 18013			

*Marilyn Branthwaite  
HP Cupertino*

# documentation

The following tables list all currently available software manuals, divided into the categories — DOS, Timeshare Systems, Languages, and other manuals. This list supersedes the previous list in the **Communicator**. Copies of manuals and update packages can be obtained from your local Sales and Service Office. The address and telephone number of the office nearest to you are listed in the back of all reference manuals.

Customers in the U.S. may also order directly by mail. Simply list the name and part number of the manuals you need on the Corporate Parts Center form supplied at the back of the **Communicator**. If you require an update package only send your request to:

Software/Publications Distribution • 11000 Wolfe Road •  
Cupertino, Ca 95014

## DISC OPERATING SYSTEM MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
02100-90074	HP 2605A Console Printer Driver	\$ 1.00	3/72	
02116-91779	Moving-Head Disc Operating System	15.00	3/71	7/72
02762-90004	HP 2762A Terminal Printer Driver	1.00	5/73	
02767-90007	DOS/RTE 2767 Line Printer Driver	1.00	12/70	
02892-90005	HP 2892A Card Reader Driver	1.50	6/72	
12560-90023	DOS and RTE CALCOMP Plotter Driver	1.50	2/70	
12587-90011	HP 12587B Asynchronous Data Set Interface Driver Reference Manual	5.00	5/74	
12602-90023	DOS/RTE Mark Sense Drivers Kit 12602B	1.00	8/70	
12908-90004	HP 12908 Writable Control Store Driver	1.00	2/75	
12920-90004	HP 12920B Asynchronous Multiplexer Interface Driver Reference Manual	5.00	5/74	
13024-90010	DOS/DOS-M Magnetic Tape Unit Driver	1.00	4/72	5/73
24307-90006	DOS-III Reference Manual	20.00	2/75	
24307-90012	DOS-III Data Communications Drivers	7.50	11/74	1/75
24307-90018	DOS-III Pocket Guide	3.50	4/75	
24307-90002	DOS-III Terminal Printer Driver	1.00	1/75	
24307-90073	DOS-III Standard Drivers	6.00	1/75	



24376-90001	IMAGE/2000 Data Base Management System Reference Manual	11.00	11/74	
5951-1366	Cross Reference Table Generator	1.00	8/74	
5951-1375	Generating DOS-M	2.50	7/72	5/73
5951-1381	DOS-M/2000C Timeshared BASIC File Handler	1.00	5/71	
5951-1393	Generating DOS	2.00	9/71	
5951-1394	2000C File Interface for DOS-M	1.00	6/71	

#### **TIMESHARED SYSTEM MANUALS**

<b>PART NUMBER</b>	<b>MANUAL TITLE</b>	<b>PRICE</b>	<b>DATE</b>	<b>UPDATE</b>
02000-90048	20856A Timeshared BASIC/2000, Level E, Reference Manual	\$10.00	9/74	
02000-90049	20856A Timeshared BASIC/2000, Level E, System Operator's Manual	5.00	9/74	
02000-90073	20854A Timeshared BASIC/2000, Level F, Reference Manual	7.50	10/74	2/75
02000-90074	20854A Timeshared BASIC/2000, Level F, System Operator's Manual	10.00	6/75	
19665-90001	2000/F to 2000/ACCESS System Upgrade Kit and Conversion Program Manual	2.00	7/75	
5952-4491	20854A Timeshared BASIC/2000, Level F, Pocket Guide	0.15	10/74	

#### **LANGUAGE MANUALS**

<b>PART NUMBER</b>	<b>MANUAL TITLE</b>	<b>PRICE</b>	<b>DATE</b>	<b>UPDATE</b>
02116-9014	HP Assembler Manual	\$ 6.50	11/74	
02116-9015	HP FORTRAN Manual	5.00	3/74	
02116-9016	Symbolic Editor	4.50	2/74	
02116-9072	ALGOL Reference Manual	10.00	10/74	
02116-9077	20392A HP BASIC Reference Manual	15.00	9/74	
12907-90010	Implementing the HP 2100 Fast FORTRAN Processor	5.00	11/74	
22687-90009	Learning Timeshare BASIC	3.00	5/75	
24307-90014	DOS III Assembler Reference Manual	8.00	7/74	
5951-1321	HP FORTRAN IV Reference Manual	6.00	11/74	
5951-1377	Assembler, FORTRAN, and ALGOL Error Messages	1.00	4/71	

#### **ADDITIONAL MANUALS**

<b>PART NUMBER</b>	<b>MANUAL TITLE</b>	<b>PRICE</b>	<b>DATE</b>	<b>UPDATE</b>
02000-90055	2000C/2000F IDF Author's Manual	\$ 8.50	1/73	8/74
02000-90080	HP 2000E to HP 2000F Conversion Guide	1.00	12/73	
02022-90014	Magnetic Tape Reformatting System Support Utilities	1.50	1/74	
02100-90129	HP 2100 Microassembler Coding Form	5.00		
02100-90140	Decimal String Arithmetic Routines	6.50	10/73	
02108-90008	Microprogramming 21MX Computers Reference Manual	5.00	8/74	2/75
02116-91751	Prepare Tape System	2.50	8/74	
02116-91752	Magnetic Tape System	6.00	6/71	
02116-91780	2100 Series Relocatable Subroutines	11.00	10/73	
19655-90005	HP 19655B Management/260 Data System Preliminary Reference Manual	10.00	11/74	
19662-90001	Management/230 Data System Preliminary Reference Manual	5.00	6/74	
20308-90001	Instructional Management Facility Proctor's Manual	7.00	9/74	
20308-90003	Instructional Management Facility System Manager's Reference Manual	5.00	10/74	
20309-90001	Instructional Dialogue Facility Proctor's Manual	10.00	9/74	
20309-90003	Instructional Dialogue Facility Course Developer's Manual	6.00	8/74	
20309-90005	Instructional Dialogue Facility Author's Pocket Guide	3.50	10/74	
20310-90001	HP MATH Teacher's Handbook	5.00	9/74	
20310-90005	HP MATH Proctor's Manual	5.00	9/74	
20310-90007	HP MATH Curriculum Guide	20.00	7/74	
20311-90001	Timeshared Graphics for Tektronix Terminals	7.00	8/74	
20311-90003	Timeshared Graphics Plotting Package	25.00	6/74	
20352-90001	Educational Budget and Accounting System — System Overview	5.00	6/74	
20352-90002	Educational Budget and Accounting System Reference Manual	15.00	3/75	
20352-90003	Educational Budget and Accounting System — Technical Manual	75.00	3/75	
20353-90001	Educational Payroll System — System Overview	3.50	10/74	
22690-90001	Instructional Management Facility for HP 2000 Access Proctor's Manual	6.50	9/75	
22690-90002	Instructional Management Facility for HP 2000 Access System Manager's Reference Manual	4.50	9/75	
22691-90001	Instructional Dialogue Facility for HP 2000 Access-Proctor's Manual	6.00	9/75	
22691-90002	Instructional Dialogue Facility for HP 2000 Access Course Developers' Manual	5.00	9/75	

22691-90003	Instructional Dialogue Facility for HP 2000 Access Author's Manual	13.00	9/75	
22691-90004	Instructional Dialogue Facility for HP 2000 Access Author's Pocket Guide	3.00	9/75	
22693-90001	HP MATH for HP 2000 Access Teacher's Handbook	5.50	9/75	
22693-90002	HP MATH for HP 2000 Access Proctor's Manual	6.50	9/75	
22693-90003	HP MATH for HP 2000 Access Curriculum Guide	17.50	9/75	
24380-90001	HP 2100 Remote Job Entry Processor	3.00	10/73	
24383-90001	Course Writing Facility	15.00	5/74	
24384-90001	College Information System — System Overview	5.00	6/74	
24384-90003	College Information System Reference Manual	*		
24384-90005	College Information System Technical Manual	95.00	5/75	
24387-90001	Basic Analysis and Mapping Program Manual	12.00	6/74	5/75
24387-90002	Basic Analysis and Mapping Program Pocket Guide	10.00	6/74	
5951-1352	The Librarian	1.00	1/71	
5951-1353	Special Purpose Magnetic Tape Loader/CAI English	1.00	1/71	
5951-1371	HP 2100 Front Panel Procedures	1.00	8/73	
5951-1376	Basic Binary Loader/Disc Loader, Basic Moving-Head Disc Loader	1.00	4/74	
5951-1392	Magnetic Tape System	1.00	7/71	
5951-1397	Commercial Subroutines	15.00	8/71	

\*Price to be determined.

# training schedule

The schedule for training courses related to HP 2000 systems is presented below. Included are courses scheduled for the next three months (October through December).

Each issue of the **Communicator** will provide timely information on training to assist you in registering for classes applicable to your system.

## HARDWARE COURSES

COURSE NUMBER	PRODUCT	COURSE LENGTH	DATES	LOCATION
22940A	2100A Operations & Maintenance	10 Days	Oct 6-17 Nov 3-14 Dec 1-12	Cupertino Rockville Cupertino
22941A	21MX Operations & Maintenance	5 Days	Nov 17-21 Dec 15-19	Cupertino Rockville
22942A	7900A Operations & Maintenance	5 Days	Oct 20-24 Dec 8-12	Cupertino Cupertino
22944A	7970E Operations & Maintenance	5 Days	Nov 3-7	Cupertino

## SOFTWARE COURSES

22952B	DOS IIIB	5 Days	Nov 3-7	Cupertino
22953A	2100 TCS/IMAGE	5 Days	Nov 10-14	Cupertino
22973A	2000/ACCESS DATA ENTRY, File Management & RJE	5 Days	Nov 3-7 Dec 1-5	Cupertino Cupertino
22950A	2100 Minicomputer Assembler	5 Days	Nov 17-21 Dec 1-5	Cupertino Rockville
22959A	21MX Minicomputer Assembler	5 Days	Oct 20-24 Oct 20-24 Nov 17-21 Dec 8-12	Cupertino Rockville Rockville Rockville
22960A	21MX Microprogramming	5 Days	Oct 27-31 Dec 1-5	Cupertino Cupertino
22974A	Minicomputers in Manufacturing	2 Days	Oct 16-17 Nov 24-25	Cupertino Cupertino

## HP Training Centers

Training is conducted in the U.S.A. at facilities in Cupertino, California and Rockville, Maryland.

Each Training Center is staffed with professional instructors. Courses are designed such that the student will receive both classroom instruction and practical, hands-on experience. By attending the courses in the recommended sequence for your particular HP system, the student will

gain the most beneficial training available to meet the needs of your specific application.

### Western Training Center

Hewlett-Packard  
11000 Wolfe Road  
Cupertino, California 95014  
(408) 257-7000

### Eastern Training Center

Hewlett-Packard  
4 Choke Cherry Road  
Rockville, Maryland 20850  
(301) 948-6370

# software tips

## "3 PROGRAMS FROM THE CONTRIBUTED LIBRARY"

There are 3 programs currently available from the HP Contributed Library that may prove useful to 9600/9700 users.

They are:

### RTE TABLE LISTER (22575A)

This program lists the device reference table (LU#), the equipment table (EQT#) and the program ID table of the system. It prints the same information as the operator commands LU, EQ, and ST. If a program is disc resident, main core limits, base page limits and a program disc address are printed.

### RTE TRACK ASSIGNMENT TABLE (22445A)

This program lists the track assignment table for LU2 and LU3. It determines if tracks are "SYSTEM", "GLOBAL", or "AVAIL".

### DISC-MT AND MT-DISC DUMP (22557A) (8K)

This absolute assembly program loads an HP 7900A Moving Head Disc from a magnetic tape and also dumps an optional number of tracks from disc to tape. The program also includes a verify option.

SIO drivers are expected for M.T. and TTY.

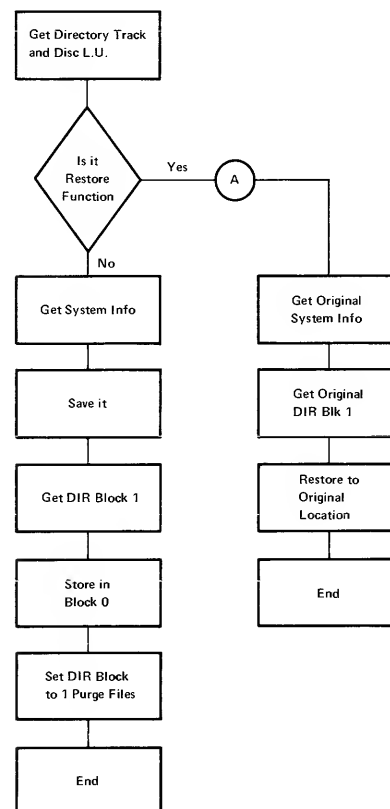
Contact your local sales office for additional information about ordering a catalog or program, or submitting a program for the library.

*Paul McGillicuddy  
HP Cupertino*

## CONVERTING A SYSTEM DISC TO A PERIPHERAL DISC

The program listed below temporarily converts a system disc to a peripheral disc. This is accomplished by temporarily relocating and saving the cartridge directory, thus making the system disc appear to be a peripheral disc. A user operating on the system disc (LU2) on subchannel A may then read files from another system disc as if it were a peripheral disc.

*Norm Wolf  
HP Fullerton*



```

0001 FTN4,L
0002 PROGRAM REFRM(3,99)
0003 DIMENSION IP(5),IDCB(144),IRUF(128),JRUF(128),NAME(3),ISIZE(2)
0004 EQUIVALENCE (IP(1),IDSCK),(IP(2),LTRK),(IP(3),IFLG)
0005 DATA NAME/2H)('2HXS,2H#'/
0006 DATA ISIZE,ITYP/2,0,12/
0007 C
0008 C THERE HAS BEEN FOR MANY YEARS THE DESIRE TO BE ABLE
0009 C TO ACCESS A FILE MANAGER DOMAIN OF A SYSTEM PLATTER
0010 C BY ANOTHER SYSTEM. THIS PROGRAM WAS WRITTEN TO ALLOW
0011 C SUCH A CAPABILITY.
0012 C
0013 C THE EXECUTION OF THIS PROGRAM IS AS FOLLOWS:
0014 C
0015 C RUN,REFRM,IDSCK,LTRK,IFLG
0016 C
0017 C WHERE IDSCK = L.U. OF THE PERIPHERAL SURCHANEL
0018 C (I.F. THE PLATTER THAT YOU WISH TO ACCESS)
0019 C
0020 C LTRK = THE TRACK NUMBER OF THE DIRECTORY TRACK
0021 C (SAME NUMBER AS RETURNED IN THE 'IDC' COMMAND)
0022 C
0023 C IFLG = A FLAG THAT SAYS WHETHER YOU ARE PATCHING THE
0024 C DISC FOR ACCESS OR RETURNING IT TO ITS ORIGINAL STA
0025 C 0 = PATCH FOR ACCESS
0026 C 1 = RETURN TO ORIGINAL STATE
0027 C
0028 C
0029 C *****
0030 C *
0031 C * ***** WARNING -- WARNING ***** *
0032 C * ----- *
0033 C * THIS PROGRAM WILL SAVE THE ORIGINAL INFORMATION IN *
0034 C * THE DIRECTORY IN A FILE NAMED )('XS#'/ AND RESTORE *
0035 C * THE DIRECTORY FROM THAT SAME FILE. THE FILE IS CREATED *
0036 C * ON L.U. 2 AND PURGED AFTER A RESTORE OPERATION. *
0037 C *
0038 C * IF YOU DO NOT RESTORE THE PATCHED DISC TO ITS ORIGINAL *
0039 C * STATE -- THEN -- THAT DISC WILL NO LONGER HAVE A SYSTEM *
0040 C * FILE MANAGER DOMAIN THAT CAN BE USED BY THAT SYSTEM. *
0041 C *
0042 C * A 'STOP 67' TERMINATION OF THIS PROGRAM MEANS THAT *
0043 C * THE SAVE FILE CAN NOT BE CREATED AND THEREFOR IT IS *
0044 C * DISASTROUS TO CONTINUE. *
0045 C *
0046 C *
0047 C *****
0048 C CALL PMPAR(IP)
0049 C
0050 C IF(LTRK .EQ. 0) LTRK = 202
0051 C IF(IDSCK .EQ. 0) IDSCK = 18
0052 C IF(ITYP .NE. 0) GO TO 500
0053 C
0054 C
0055 C CALL EXEC(1,IDSCK,JRUF,128,LTRK,0)
0056 C CALL CREAT(IDCB,IERR,NAME,ISIZE,ITYP,0,-2)
0057 C IF(IERR .LT. 0) STOP 67
0058 C CALL TATCH(LTRK,77777R,IVAR)
0059 C CALL EXEC(1,IDSCK,IRUF,128,LTRK,14)
0060 C CALL EXEC(2,IDSCK,IRUF,128,LTRK,0)
0061 C DO 100 INDX = 1,128,16
0062 C IRUF(INDX) = -1
0063 100 CONTINUE

```

```

0064      CALL EXEC (2,IDSCK,IBUF,128,LTRK,14)
0065      CALL TATCH(LTRK,IVAR,IDUM)
0066      CALL WRITE(IDCB,IFRR,JBUF,128)
0067      CALL WRITE(IDCB,IFRR,JBUF,-1)
0068      CALL CLOSE (IDCB,IERR)
0069      STOP 77
0070      C
0071      C
0072      500  CONTINUE
0073      CALL OPEN(IDCB,IERR,NAME,0,-2)
0074      CALL READ(IDCB,IFRR,JBUF,128,LEN)
0075      CALL TATCH(LTRK,77777B,IVAR)
0076      CALL EXEC(1,IDSCK,IBUF,128,LTRK,0)
0077      CALL EXEC(2,IDSCK,IBUF,128,LTRK,14)
0078      CALL EXEC(2,IDSCK,JBUF,128,LTRK,0)
0079      CALL TATCH(LTRK,IVAR,IDUM)
0080      CALL CLOSE(IDCB,IERR)
0081      CALL PURGE(IDCB,IFRR,NAME,0,-2)
0082      C
0083      C
0084      9999  CONTINUE
0085      END

```

```

** NO ERRORS**      PROGRAM = 00624      COMMON = 00000

```

```

0086      SUBROUTINE TATCH(ITRCK,IVAR1,IVAR2)
0087      DIMENSION IGET(1)
0088      IGET(0) = 1
0089      TATAD = IGET(1656B)
0090      TATAD = TATAD + LTRK
0091      IVAR2 = IGET(TATAD)
0092      CALL IPUT(TATAD,IVAR1)
0093      RETURN
0094      END

```

```

** NO ERRORS**      PROGRAM = 00051      COMMON = 00000

```

# bulletins

## POWER FAIL/AUTO RESTART FOR RTE-B

In the August 15th issue of the **Communicator**, the part number given for RTSGN is incorrect. The proper number is 29101-60011, Rev. B.

## NEW RTE POCKET GUIDE

Now available for RTE users is a new pocket guide, or mini-manual, that contains condensed data on RTE-II/III (including EDITR), Batch Spool Monitor, system errors and tables, plus Assembler, ALGOL, FORTRAN, and Library errors. Reduced to 3-1/2 by 7 inches (shirt pocket size), the *RTE Pocket Guide*, HP Part No. 92060-90010, will prove invaluable to the RTE system user as a quick reference guide. Contact your HP sales representative for copies.

# software updates

## 9600 SECTION SOFTWARE UPDATES

The following table describes currently available software for the Real-Time Executive Disc-Based System (RTE-II).

TAPE NUMBER	DESCRIPTION	MANUALS
0802-60001-C	SYSTEM DUMP F.H. DISC ONLY	
0805-60001-C	RTE EDITOR	
0875-60001-E THROUGH	RTE FORTRAN II	
0875-60005-E		
4016-60001-A	PREPARE TAPE SYSTEM	
4129-60001-C	RTE-DOS ALGOL	
4129-60002-C	RTE-DOS ALGOL	
4151-60001-D	RTE/DOS RELOCATABLE LIBRARY (EAO)	
4152-60001-C	RTE/DOS FORTRAN IV LIBRARY	
4153-60001-C THROUGH	RTE/DOS FORTRAN FORMATTER	
4170-60003-C	RTE/DOS FTN4 COMPILER (5K BG AREA)	
4177-60001-1442	RTE/DOS FTN4 COMPILER (12K BG AREA)	
4177-60002-1442	RTE/DOS FTN4 COMPILER (12K BG AREA)	
4248-60001-B	RTE/DOS RELOC. LIB. - FLT. POINT	
9013-60001-C	7902 MOVING HEAD DISC DRIVER DVR31	
2001-12001-B	RTE-II ASSEMBLER	
2001-16002-C	RELOCATING LOADER	
2001-16003-B	MULTI-TERMINAL MONITOR	
2001-16004-C	POWER FAIL (DVP43)	
2001-16005-B	RTE-II SYSTEM LIBRARY	
2001-16012-C	RTE-II CORE RESIDENT SYSTEM	
2001-16013-C	M.H. GENERATOR	
2001-16014-B	AUTO RESTART	
2002-16010-C	INTERACTIVE EDITOR EDITR	
2002-12001-C	BATCH-SPOOL MONITOR, D.RTR AND FMC	
2002-12002-C	BATCH-SPOOL MONITOR, SPOOL	
2002-16006-B	BATCH-SPOOL MONITOR LIBRARY	
1100-60001-B	SYMBOLIC EDITOR	
5117-60574-A	1005 ASSEMBLER, EAO	
5117-60289-B	HP FORTRAN COMPILER PASS 1	
5121-60014-A	HP FORTRAN COMPILER PASS 2 (EAO)	
9029-60001-C	MULTIPLE DEVICE DRIVER DVR40	
9101-60001-B	RTE-C EXECUTIVE (FXEC)	
9101-60002-B	RTE-C SCHEDULER (SCHED)	
9101-60003-B	RTE-C I/O CONTROL (RTIOC)	
9101-60004-B	RTE-C ABS. PROGRAM LOADER (APLOR)	
9101-60010-A	RTE-C RELOCATING LOADER	
9101-60011-B	RTE-C SYSTEM GENERATOR (RTSGN)	
4248-60001-B	RTE-DOS FLOATING POINT LIBRARY	
5117-60069-C	RTE-B BASIC INTERPRETER	
9102-60001-D	RTE-B LIBRARY	
9102-60009-B	RTE-B BRANCH AND MNEMONIC TABLE	
9102-60012-A	TRAP LIBRARY	
9102-60013-A	TTY EVENT SENSE (TTYEV)	
9102-60014-A	6940 ALARM (ALARM)	
9102-60015-C	RTE-B TABLE GENERATOR (RTBTG)	
9102-60016-A	2313 SUBSYSTEM (A2313)	
9102-90017-A	6940 SUBSYSTEM (A6940)	

2000-60001-A		RTE-B OPERATING SUYSTEM (RTBOS)
1700-16001-B	PLOS	PROGRAM LOAD AND SAVE MONITOR
1700-16002-B	REMAT	OPERATOR INTERFACE
1700-16003-B	NPRGL	PROG. LOAD MONITOR (SCE/1 & 2)
1700-16004-B	PROGL	PROGRAM LOAD MONITOR
1700-16005-B	OPERM	OPERATOR COMMAND MODULE
1700-16006-B	DLIST	DIRECTORY LIST
1700-16007-B	UPLIN	UP-LINE COMMUNICATION MONITOR
1700-16009-C	LSTEN	CCE INITIALIZATION MODULE
1700-16024-C	PTOPM	PROGRAM-TO-PROGRAM MONITOR
1700-16025-B	RFAFX	REMOTE FILE ACCESS EXECUTION MODUL
1700-16026-B	RFAM	REMOTE FILE ACCESS MONITOR
1700-16027-B	EXECN	EXECUTIVE CALL MONITOR
1700-16029-B	RFSS	SYSTEM RESIDENT COMMON
1700-16030-C	QUEQE	SYSTEM QUEUE MODULE
1700-16037-B	SCEGN	SATELLITE GENERATION PROGRAM
1700-16044-C	CCE LIR1	CENTRAL COMMUNICATION LIBRARY #1
1700-16045-B	CCE LIR2	CENTRAL COMMUNICATION LIBRARY #2
1700-16049-C	PLOSH	PROGRAM LOAD AND SAVE MODULE
9001-60003-C	OVR65	RTE COMMUNICATION DRIVER
9037-60001-B		BOOTSTRAP LOADER
1703-16006-B		SCE/2 (4K)
1703-16007-B		SEC/2 (8K)
1703-16008-B		SEC/2 (12K)
1703-16009-B		SCE/2 (16K)
1703-16010-B		SCE/2 (24K)
1703-16011-B		SCE/2 (32K)
9002-60003-C	D.65	COMPUTER SERIAL INTERFACE DRIVER
9020-60001-A	L65	FTN./ALGOL INTERF. SUBR. FOR D.65
1703-16002-C	TEXEC	TERMINAL EXECUTIVE
1703-16004-C	RTAM(RCS)	TERMINAL ACCESS MONITOR
1703-16003-C	RFAIN	REMOTE FILE ACCESS INITIATOR
9037-60006-A	.IOC.	INPUT/OUTPUT CONTROL SUBROUTINE
9037-60007-B	D.400	SCE/3 TELETYPE DEFEETER
1704-16003-B	%INTR	INTERRUPT MODULE
1704-16010-B	%BUFR	SYSTEM BUFFERS AND FLAG MODULE
1704-16011-B	BNTBL	BRANCH MNEMONIC TABLE
1704-16013-B	%RFAN	SCE/4 REMOTE FILE ACCESS
1704-16013-B	%OPMD	OPERATOR COMMAND MODULE
1704-16013-B	%ASGN	H1 LEVEL REMOTE FILE ACCESS MODULE
1704-16013-B	%PTP	PROG.-TO-PROG. COMMUNICATION MODUL
1704-16013-B	%BSPV	SCE/4 SUPERVISOR
1704-16013-B	%TAM	SEC/4 TERMINAL ACCESS MONITOR
1705-16001-B	%QUE	REQUEST QUEING
1705-16002-B	%DISP	REQUEST DISPATCHER
1705-16004-C	%PTPO	SLAVE PROGRAM-TO-PROGRAM MAILBOX
1705-16003-B	%DEN	REQUEST COMPLETER
1705-16006-B	%INTR	INTERPUOT SERVICE
1705-16007-B	%RQPR	REQUEST PROCESSOR
1705-16009-B	REMAC	OPERATOR INTERFACE
1705-16011-B	%PTP	SLAVE PROGRAM-TO-PROGRAM INTERFACE
1705-16010-B	%REFA	REMOTE FILE ACCESS, REMOTE EXEC,
1705-16010-B	%REFA	MASTER PROG-TO-PROG INTERFACE
1705-16013-A	%CLOCK	TIME-OUT MONITOR
1705-16012-B	OMESG	CENTRAL OPERATOR MESSAGE INTERFACE
1705-16005-B	ENABLR	ENABLE SATELLITE
1705-16008-B	APLDR	ABS. PROG. LOADER (SATELLITE)
0808-60001	OVR 10	RTE PLOTTER OVR 10
9030-60001-B	OVR 11	HP2892A CARD READER
9028-60001-B	OVR 12	HP2610A/2614A LINE PRINTER
9028-60002-A	OVR 12	HP2757A LINE PRINTER

09600-03010

4169-60001-A	DVR 12		
2200-16001-A	DVR 12	HP2607A LINE PRINTER	92200-93001
7601-16021-A	DVR 15	HP7261A MARK SENSE CARD READER	09601-93014
7821-60001-B	DVR 15	MARK SENSE READER W/12602R KIT	
2202-16001-A	DVR 23	HP7070 9-TRACK MAG TAPE	92202-93001
3025-60001-A	DVR		
5117-60499-D	DVR 24	HP7970 7-TRACK MAG TAPE	25117-93003
0747-60001-C	DVR 30	RTE DISC/DRUM	
9100-60041-A	DVR 40	HP12604B DATA SOURCE INTERFACE	29100-93001
7295-60001-A	DVR 40	HP12604B DATA SOURCE INTERFACE	12604-93002
7117-60477-1523	DVR 47		
5117-60551-A	DVR 54	HP12556B 40-BIT OUTPUT REG.	25117-93001
0398-60001-A	DVR 55	HP2312A	
0297-60001-D	DVR 56	HP 2310/2311 SUBSYSTEM	02310-90004/
0297-60001-D			02311-90001
0396-60001-A	DVR 57	HP12564A 10-BIT A-TO-D CARD	12564-90041
4907-60001-D	DVR 61	HP6040A/6941A MULTIPROGRAMMER	29100-93003
9009-60001-C	DVR 62	HP2313B A-TO-D INTERFACE SUBSYS.	29009-93001
9001-60001-D	DVR 65	HP12771A COMPUTER SERIAL INTERF.	12565-93001
9001-60003-*	DVR 65	COMPUTER SERIAL INTERF. (DIST. SYS.)	91700-93001
9003-60001-A	DVR 66	HP 12770A COUPLER SERIAL INTERF.	29003-93003
7003-60001-A	DVR 66	HP 12772A COUPLER MODEM INTERF.	29003-93001
4341-16002	DVR 67	12889A SERIAL INTERF.	
5117-60414-B	DVR 70	HP6129/6130/6131 DIG. VOLT. SOURCE	25117-93005
9000-60001-A	DVR 74	HP2321A LO-SPEED DATA ACQUISITION	02321-93001
0236-60001-A	DVR 76	HP2320A LO-SPEED DATA ACQUISITION	02320-93002
0235-60001-A	DVR 77	HP2323A LO-SPEED DATA ACQUISITION	02323-93001
9601-16001-A		HP12551R/12554A/12597A/12556B/	09601-93005
9601-16001-A		GENERAL PURPOSE REGISTERS	
9601-16009-A		HP5326A-H18 COUNTER	09601-93009
9601-16010-A		HP5327A/B-H48 COUNTER	09601-93007
9601-16011-A		RTE-B HP12604B D.S.I. SUBR.	00601-93013
9601-16012-A		HP2320A DVD/SCANNER SUBSYSTEM	09601-93011
9601-16014-A		HP3460H/3464A DIG. MULTIFUNCTION	09601-96016
9601-16020-A		HP12555B D-TO-A COUNTER	09601-93017
9601-16022-A		HP12556B 40-BIT OUTPUT REGISTER	09601-93015
7601-16024-B		HP2323A DVM SCANNER SUBSYSTEM	09601-93018
0288-60001-A		CONVERT ROUTINE: BCD-TO-FLT. POINT	02323-00001
9011-60001-E		HP2313 INTERF. MAIN MODULE R2313	29009-93001
9011-60002-A		HP2313 INTERF. PACER MODULE P2313	29009-93001
9001-60003-A		HP2313 INTERF. TO HP2930 R2930	29009-93001
9011-60004-A		HP2313 INTERF. DUAL DAC 02313	29009-93001
9021-60001-A	DLK65	FTN/ALGOL INTERF. FOR DVR65	12565-93001
9100-16001-A		HP6129/6130/6131 DIG. VOLT SOURCE	29100-93005
9100-16003-A		DEVICE SUBROUTINE LIBRARY	29100-93007
9100-60044-A		HP5326A/5327A TIMER/COUNTER/DVM	91064-93007
0007-60001-A	0.20	HP1406/1506 KENNEDY MAG TAPE	
0008-60001-B	0.40	HP12604B DIG. SOURCE INTERF. (8421)	
0011-60001-B	0.40	HP12604B D.S.I. (4221/8421)	
0009-60001-B	0.41	DVM PROGRAM CONTROL	



0024-60001-B	0.41	HP2402A DVM PROGRAM CONTROL	
0010-60001-C	0.42	HP2911A/B SCANR. NON-INTERRUPT (8421)	
0012-60001-C	0.42	HP 2911A/B SCANNER (4221/8421)	
0025-60001-A	0.42	HP2612A SCANR. NON-INTERRUPT	
0502-60001-B	0.43	HP12539A TIME BASE GENERATOR	
0098-60001-C	0.54	40-BIT OUTPUT REGISTER	
0076-60001-A	0.55	HP2312A SUBSYSTEM	
0073-60001-C	0.56	HP2311A A/D SUBSYS. NON-DMA	02311-90001
0093-60001-C	0.56	HP2311A A/D SUBSYS. DMA	02311-90001
9007-60001-C	0.62	HP 2323B SUBSYSTEM, NON-DMA	02313-93002
9008-60001-E	0.62	HP 2313B SUBSYSTEM, DMA	02313-93002
9002-60001-B	0.65	HP12771A COMPUTER SERIAL INTERF.	12665-90001
0002-60003-*	0.65	COMPUTER SERIAL INTERF. (DIST. SYS)	91703-93001
9004-60001-A	0.66	HP12770A COUPLER SERIAL INTERF.	12813-90001
0094-60001-B	0.76	HP2310A/B/C MULTI-MINIVERTER	02310-90004
0028-60001-B	0.77	HP2323A SUBSYSTEM (SCN 0.77)	02323-90001
0501-60001-E	0.77	SCANNER-DVM PROG. CNTL. (8421)	
0517-60001-C	0.77	SCANNER-DVM PROG. CNTL. (4221)	
0532-60001-A	0.77	HP2321A SCAN ROUTINE (SCN34)	02321-93001
0074-60001-A		HP2311A A/D SUBSYS. FTN/ALGOL CALLS	02311-90001
0078-60001-A		HP2312A SUBSYS. FTN INTERF. (L2313)	
0096-60001-A	ICON	HP2310A/B/C SUBSYS. DATA CONVERSION	02310-90004
0210-60001-A	ICON	DVM DATA CONVERSION BCD/FP	
0533-60001-A	CON3	HP2321 SUBSYS. BCD/FP	02321-93001
9010-60001-A	12313	HP2313B SUBSYS. FTN/ALGOL CALLS	02313-93002
9017-60001-A	L65	FTN/ALGOL INTERFACE FOR 0.65	12665-90001
9018-60001-A		ASMB INTERFACE FOR 0.65 (DIR65)	12665-90001
9019-60001-A	URL65	FTN/ALGOL INTERFACE FOR 0.65	12665-90001
0920-60002-A	L65	FTN/ALGOL INTERF. 0.65 (DIST. SYS)	91703-93001
9100-60016-A		BUFFERED TTY DRIVER (24K)	
9100-60017-A		TTY DRIVER LF-COMPATIBLE (24K)	
9100-60018-A		SYSTEM DUMP (24K)	
9100-60019-A		PHOTO READER DRIVER (24K)	
9100-60020-A		TAPE PUNCH DRIVER (24K)	
9100-60021-A		HP2778A LINE PRINTER DRIVER (24K)	
9100-60022-A		HP2767 LINE PRINTER DRIVER (24K)	
9100-60023-A		HP7970 MAGNETIC TAPE DRIVER (24K)	
9100-60024-A		HP2020 MAGNETIC TAPE DRIVER (24K)	
9100-60025-A		HP3030 MAGNETIC TAPE DRIVER (24K)	
9100-60048-A		HP2610/2614 LINE PRINTER DVR. (24K)	
9100-60049-A		HP7970 MAGNETIC TAPE DRIVER (24K)	
9100-60050-A		HP2762 TERMINAL PRINTER DVR. (24K)	
0209-60001-C		JAC LIBRARY	
9103-60001-A		SYSTEM CROSS LOADER (SXL)	
9103-60019-B		BOS GENERATOR (SXL-BOSGN)	
2401-60001-A		THERMOCOUPLE LINEARIZATION PACKAGE	
2402-60001-A		HUMIDITY PACKAGE	
2403-60001-A		STATISTICS PACKAGE	
2404-60001-A		CODE CONVERSION PACKAGE	
2405-60001-A		CURVE FITTING PACKAGE	
2406-60001-A		INTERPOLATION PACKAGE	
2407-60001-A		INTEGRATION PACKAGE	
2409-60001-B		HP7210A PLOTTER LIBRARY	
9610-60017-A		ISA FORTRAN	
9610-60018-A		TABLE GENERATOR	
9610-60019-B		EVENT SENSE INTERRUPT HANDLER	
9610-60024-B		EVENT SENSE	

0810-60001  
 4150-60001-D  
 0072-60001-C  
 0075-60001-D  
 0077-60001-B  
 0337-60001-E  
 0338-60001-D  
 0339-60001-B  
 0341-60001-B  
 0344-60001-A  
 7348-60001-C  
 7349-60001-D  
 0411-60001-B  
 0429-60001-C  
 0430-60001-B  
 0436-60001-A  
 0530-60001-D  
 0583-60001-C  
 5154-60008-B  
 9005-60001-C  
 9006-60001-A  
 9023-60001-A  
 9024-60001-B  
 9025-60001-A  
 9026-60001-A  
  
 2313-62001-A  
 20802-60001-C  
 20805-60001-C  
 20875-60001-E  
 THROUGH  
 20875-60005-E  
 24016-60001-A  
 24129-60001-C  
 24129-60002-C  
 24151-60001-D  
 24152-60001-C  
 24153-60001-C  
 THROUGH  
 24170-60003-C  
 24177-60001-1442  
 24177-60002-1442  
 24248-60001-B  
 29013-60001-C  
 92001-12001-B  
 92001-16002-C  
 92001-16003-B  
 92001-16004-C  
 92001-16005-B  
 92001-16012-C  
 92001-16013-C  
 92001-16014-B  
 92002-16010-C  
 92002-12001-C  
 92002-12002-C  
 92002-16006-B  
 20100-60001-B  
 25117-60574-A  
 25117-60289-B  
 25121-60014-A  
 29029-60001-C

RTE/DOS PLOTTER LIB  
 RTE/DOS RELOC. LIB. NON-FAH  
 VERIFY: DAC AXEPT  
 VERIFY: 2311A SUBSYS. (5610 A-D)  
 2312A SUBSYSTEM VERIFICATION TEST  
 DIAG.: 12604B DS1  
 TEST: 2310C SUBSYSTEM  
 TEST: 2310A/B SUBSYSTEM  
 VERIFY: 2912 SCNR/DVM TEST  
 DIAG.: 10-BIT A-TO-D CARD 12564A  
 DIAG.: 40-BIT POS. TRUE OUTPUT REG.  
 VERIFY: 2911 SCNR/DVM TEST  
 TEST: KENNEDY 1406/1506 MAG TAPE  
 DIAG.: 2912A PROGRAMMER CARD  
 DIAG.: 2402A PROG. DATA INTERFACE  
 DIAG.: DVS PROGRAM CARD 12661A  
 VERIFY: 2321A SUBSYSTEM (3450/2911  
 CALIBRATION: 2311A (WITH TTY)  
 7970 9-TRACK DUMP/VERIFY PROGRAM  
 DIAG.: 12665-60001 INTERFACE  
 DIAG.: 12813-60001 INTERFACE  
 DIAG.: 12772 COUPLER MODEM INTERF.  
 DIAG.: 12773 COMPUTER MODEM INTERF.  
 VERIFY: HP 2313B DUAL DAC  
 DIAG.: 40-BIT GND. TRUE OUTPUT REG  
  
 VERIFY: FOR 2313B SUBSYSTEM  
 SYSTEM DUMP F.H. DISC ONLY  
 RTE EDITOR  
  
 RTE FORTRAN II  
  
 PREPARE TAPE SYSTEM  
 RTE-DOS ALGOL  
 RTE-DOS ALGOL  
 RTE/DOS RELOCATABLE LIBRARY (EAD)  
 RTE/DOS FORTRAN IV LIBRARY  
 RTE/DOS FORTRAN FORMATTER  
 RTE/DOS FTN4 COMPILER (5K BG AREA)  
  
 RTE/DOS FTN4 COMPILER (12K BG AREA)  
 RTE/DOS FTN4 COMPILER (12K BG AREA)  
 RTE/DOS RELOC. LIB. - FLT. POINT  
 7900 MOVING HEAD DISC DRIVER DVR31  
 RTE-II ASSEMBLER  
 RELOCATING LOADER  
 MULTI-TERMINAL MONITOR  
 POWER FAIL (DVP43)  
 RTE-II SYSTEM LIBRARY  
 RTE-II CORE RESIDENT SYSTEM  
 M.H. GENERATOR  
 AUTO RESTART  
 INTERACTIVE EDITOR EDITR  
 BATCH-SPOOL MONITOR, D.RTR AND FMC  
 BATCH-SPOOL MONITOR, SPOOL  
 BATCH-SPOOL MONITOR LIBRARY  
 SYMBOLIC EDITOR  
 TDS ASSEMBLER, FAH  
 HP FORTRAN COMPILER PASS 1  
 HP FORTRAN COMPILER PASS 2 (FAH)  
 MULTIPLE DEVICE DRIVER DVR00

29101-60001-B		RTE-C EXECUTIVE (EXEC)
29101-60002-B		RTE-C SCHEDULER (SCHED)
29101-60003-B		RTE-C I/O CONTROL (RTIOC)
29101-60004-B		RTE-C ABS. PROGRAM LOADER (APLDR)
29101-60010-A		RTE-C RELOCATING LOADER
29101-60011-B		RTE-C SYSTEM GENERATOR (RTSGN)
24248-60001-B		RTE-DOS FLOATING POINT LIBRARY
25117-60069-C		RTE-B BASIC INTERPRETER
29102-60001-D		RTE-B LIBRARY
29102-60009-B		RTE-B BRANCH AND MNEMONIC TABLE
29102-60012-A		TRLIB TRAP LIBRARY
29102-60013-A		TTY EVENT SENSE (TTYEV)
29102-60014-A		6940 ALARM (ALARM)
29102-60015-C		RTE-B TABLE GENERATOR (RTBTG)
29102-60016-A		2313 SUBSYSTEM (A2313)
29102-90017-A		6940 SUBSYSTEM (A6940)
92000-60001-A		RTE-B OPERATING SYSTEM (RTHOS)
91700-16001-B	PLOS	PROGRAM LOAD AND SAVE MONITOR
91700-16002-B	REMAT	OPERATOR INTERFACE
91700-16003-B	NPRGL	PROG. LOAD MONITOR (SCE/1 & 2)
91700-16004-B	PROGL	PROGRAM LOAD MONITOR
91700-16005-B	OPERM	OPERATOR COMMAND MODULE
91700-16006-B	DLIST	DIRECTORY LIST
91700-16007-B	DPLIN	UP-LINE COMMUNICATION MONITOR
91700-16009-C	LSTEN	CCE INITIALIZATION MODULE
91700-16024-B	PTOPM	PROGRAM-TO-PROGRAM MONITOR
91700-16025-B	RFAEX	REMOTE FILE ACCESS EXECUTION MODULE
91700-16026-B	RFAM	REMOTE FILE ACCESS MONITOR
91700-16027-B	EXECM	EXECUTIVE CALL MONITOR
91700-16029-B	RESS	SYSTEM RESIDENT COMMON
91700-16030-C	QUEUE	SYSTEM QUEUE MODULE
91700-16037-B	SCEGN	SATELLITE GENERATION PROGRAM
91700-16044-C	CCE LIB1	CENTRAL COMMUNICATION LIBRARY #1
91700-16045-B	CCE LIB2	CENTRAL COMMUNICATION LIBRARY #2
91700-16049-C	PLOSH	PROGRAM LOAD AND SAVE MODULE
29001-60003-C	DVR65	RTE COMMUNICATION DRIVER
29037-60001-B		BOOTSTRAP LOADER
91703-16006-B		SCE/2 (4K)
91703-16007-B		SEC/2 (8K)
91703-16008-B		SEC/2 (12K)
91703-16009-B		SCE/2 (16K)
91703-16010-B		SCE/2 (24K)
91703-16011-B		SCE/2 (32K)
29002-60003-C	D.65	COMPUTER SERIAL INTERFACE DRIVER
29020-60001-A	L65	FTN./ALGOL INTERF. SUBR. FOR D.65
91703-16002-C	TEXEC	TERMINAL EXECUTIVE
91703-16004-C	#TAM(RCS)	TERMINAL ACCESS MONITOR
91703-16003-C	RFAIN	REMOTE FILE ACCESS INITIATOR
29037-60006-A	.IOC.	INPUT/OUTPUT CONTROL SUBROUTINE
29037-60007-B	D.RND	SCE/3 TELETYPE RECEIVER
91704-16003-B	XINTR	INTERRUPT MODULE
91704-16010-B	XBUFR	SYSTEM BUFFERS AND FLAGS MODULE
91704-16011-B	BNTBL	BRANCH MNEMONIC TABLE
91704-16013-B	XRFAH	SCE/4 REMOTE FILE ACCESS
91704-16013-B	XOPMD	OPERATOR COMMAND MODULE
91704-16013-B	XASGN	HI LEVEL REMOTE FILE ACCESS MODULE
91704-16013-B	XPTP	PROG.-TO-PROG. COMMUNICATION MODULE
91704-16013-B	XHSPV	SCE/4 SUPERVISOR
91704-16013-B	XTAM	SEC/4 TERMINAL ACCESS MONITOR
91705-16001-B	XQUE	REQUEST QUEING
91705-16002-B	DISP	REQUEST DISPATCHER

91705-16004-C	●PTPQ	SLAVE PROGRAM-TO-PROGRAM MAILBOX	
91705-16003-B	●DEFQ	REQUEST COMPLETER	
91705-16006-B	XINTR	INTERRUPT SERVICE	
91705-16007-B	●RQPR	REQUEST PROCESSOR	
91705-16009-B	REFAC	OPERATOR INTERFACE	
91705-16011-B	●PTP	SLAVE PROGRAM-TO-PROGRAM INTERFACE	
91705-16010-B	●REFA	REMOTE FILE ACCESS, REMOTE EXEC,	
91705-16010-B	●REFA	MASTER PROG-TO-PROG INTERFACE	
91705-16013-A	●CLCK	TIME-OUT MONITOR	
91705-16012-B	DMESG	CENTRAL OPERATOR MESSAGE INTERFACE	
91705-16005-B	ENAPLE	ENABLE SATELLITE	
91705-16008-B	APLDR	AHS, PROG. LOADR (SATELLITE)	
20808-60001	DVR 10	RTE PLOTTER DVR 10	
29030-60001-B	DVR 11	HP2692A CARD READER	09600-93010
29028-60001-B	DVR 12	HP2610A/2614A LINE PRINTER	
29028-60002-A	DVR 12	HP2767A LINE PRINTER	
24169-60001-A	DVR 12		
92200-16001-A	DVR 12	HP2607A LINE PRINTER	92200-93001
09601-16021-A	DVR 15	HP7261A MARK SENSE CARD READER	09601-93014
20821-60001-B	DVR 15	MARK SENSE READER W/12632B KIT	
92202-16001-A	DVR 23	HP7970 9-TRACK MAG TAPE	92202-93001
13025-60001-A	DVR		
25117-60499-D	DVR 24	HP7970 7-TRACK MAG TAPE	25117-93003
20747-60001-C	DVR 30	RTE DISC/DRUM	
29100-60041-A	DVR 40	HP12604B DATA SOURCE INTERFACE	29100-93001
20295-60001-A	DVR 40	HP12604B DATA SOURCE INTERFACE	12604-93002
25117-60477-1523	DVR 47		
25117-60551-A	DVR 54	HP12556B 40-BIT OUTPUT REG.	25117-93001
20398-60001-A	DVR 55	HP2312A	
20297-60001-D	DVR 56	HP 2310/2311 SUBSYSTEM	02310-90004/
20297-60001-D			02311-90001
20396-60001-A	DVR 57	HP12564A 10-BIT A-TO-D CARD	12564-90041
14907-60001-D	DVR 61	HP6940A/6941A MULTIPROGRAMMER	29100-93003
29009-60001-C	DVR 62	HP2313B A-TO-D INTERFACE SUBSYS.	29009-93001
29001-60001-D	DVR 65	HP12771A COMPUTER SERIAL INTERF.	12665-93001
29001-60003-X	DVR 65	COMPUTER SERIAL INTERF. (DIST. SYS.)	91700-93001
29003-60001-A	DVR 66	HP 12770A COUPLER SERIAL INTERF.	29003-93003
23003-60001-A	DVR 66	HP 12772A COUPLER MODEM INTERF.	29003-93001
24341-16002	DVR 67	12809A SERIAL INTERF.	
25117-60414-B	DVR 70	HP6129/6130/6131 DIG. VOLT. SOURCE	25117-93005
09611-16005	DVA 72	RTE MPG DRIVER LOCAL/REMOTE	6940A/B
29000-60001-A	DVR 74	HP2321A LO-SPEED DATA ACQUISITION	02321-93001
20236-60001-A	DVR76	HP2320A LO-SPEED DATA ACQUISITION	02320-93002
20235-60001-A	DVR77	HP2323A LO-SPEED DATA ACQUISITION	02323-93001
09601-16001-A		HP12551B/12554A/12597A/12566B/	09601-93005
09601-16001-A		GENERAL PURPOSE REGISTERS	
09601-16009-A		HP5326A-H18 COUNTER	09601-93009
09601-16010-A		HP5327A/B-H48 COUNTER	09601-93007
09601-16011-A		RTE-H HP12604B D.S.I. SUBR.	09601-93013
09601-16012-A		HP2320A DVM/SCANNER SUBSYSTEM	09601-93011
09601-16014-A		HP3480B/3484A DIG. MULTIFUNCTION	09601-96016
09601-16020-A		HP12555B D-TO-A COUNTER	09601-93017
09601-16022-A		HP12556B 40-BIT OUTPUT REGISTER	09601-93015
09601-16024-B		HP2323A DVM SCANNER SUBSYSTEM	09601-93018
20288-60001-A		CONVERT ROUTINE: SCO-TO-FLT. POINT	02323-90001
29011-60001-E		HP2313 INTERF. MAIN MODULE R2313	29009-93001
29011-60002-A		HP2313 INTERF. PACER MODULE P2313	29009-93001
29001-60003-A		HP2313 INTERF. TO HP2930 R2930	29009-93001
29011-60004-A		HP2313 INTERF. DUAL DAC D2313	29009-93001
29021-60001-A	DLK65	FTN/ALGOL INTERF. FOR DVR65	12665-93001
29100-16001-A		HP6129/6130/6131 DIG. VOLT SOURCE	29100-93005

29100-16003-A		DEVICE SUBROUTINE LIBRARY	29100-93007
29100-60044-A		HP5326A/5327A TIMER/COUNTER/DVM	91064-93007
20007-60001-A	D.20	HP1406/1506 KENNEDY MAG TAPE	
20008-60001-B	D.40	HP12604B DIG. SOURCE INTERF. (8421)	
20011-60001-B	D.40	HP12604B D.S.I. (4221/8421)	
20009-60001-B	D.41	DVM PROGRAM CONTROL	
20024-60001-B	D.41	HP2402A DVM PROGRAM CONTROL	
20010-60001-C	D.42	HP2911A/B SCANR. NON-INTERRUPT (8421)	
20012-60001-C	D.42	HP 2911A/B SCANNER (4221/8421)	
20025-60001-A	D.42	HP2612A SCANR. NON-INTERRUPT	
20502-60001-B	D.43	HP12539A TIME BASE GENERATOR	
20098-60001-C	D.54	40-BIT OUTPUT REGISTER	
20076-60001-A	D.55	HP2312A SUBSYSTEM	
20073-60001-C	D.56	HP2311A A/D SUBSYS. NON-DMA	02311-90001
20093-60001-C	D.56	HP2311A A/D SUBSYS. DMA	02311-90001
29007-60001-C	D.62	HP 2323B SUBSYSTEM, NON-DMA	02313-93002
29008-60001-E	D.62	HP 2313B SUBSYSTEM, DMA	02313-93002
29002-60001-B	D.65	HP12771A COMPUTER SERIAL INTERF.	12665-90001
29002-60003-*	D.65	COMPUTER SERIAL INTERF. (DIST. SYS)	91703-93001
29004-60001-A	D.66	HP12770A COUPLER SERIAL INTERF.	12813-90001
20094-60001-B	D.76	HP2310A/B/C MULTI-MINIVERTER	02310-90004
20028-60001-B	D.77	HP2323A SUBSYSTEM (SCN D.77)	02323-90001
20501-60001-E	D.77	SCANNER-DVM PROG. CNTL. (8421)	
20517-60001-C	D.77	SCANNER-DVM PROG. CNTL. (4221)	
20532-60001-A	D.77	HP2321A SCAN ROUTINE (SCN34)	02321-93001
20074-60001-A		HP2311A A/D SUBSYS. FTN/ALGOL CALLS	02311-90001
20078-60001-A		HP2312A SUBSYS. FTN INTERF. (L2313)	
20096-60001-A	MC0N	HP2310A/B/C SUBSYS. DATA CONVERSION	02310-90004
20210-60001-A	IC0N	DVM DATA CONVERSION BCD/FP	
20533-60001-A	CON3	HP2321 SUBSYS. BCD/FP	02321-93001
29010-60001-A	I2313	HP2313B SUBSYS. FTN/ALGOL CALLS	02313-93002
29017-60001-A	L65	FTN/ALGOL INTERFACE FOR D.65	12665-90001
29018-60001-A		ASMB INTERFACE FOR D.65 (D1R65)	12665-90001
29019-60001-A	DRL65	FTN/ALGOL INTERFACE FOR D.65	12665-90001
20920-60002-A	L65	FTN/ALGOL INTERF. D.65 (DIST. SYS)	91703-93001
29100-60016-A		BUFFERED TTY DRIVER (24K)	
29100-60017-A		TTY DRIVER LP-COMPATIBLE (24K)	
29100-60018-A		SYSTEM DUMP (24K)	
29100-60019-A		PHOTO READER DRIVER (24K)	
29100-60020-A		TAPE PUNCH DRIVER (24K)	
29100-60021-A		HP2778A LINE PRINTER DRIVER (24K)	
29100-60022-A		HP2767 LINE PRINTER DRIVER (24K)	
29100-60023-A		HP7970 MAGNETIC TAPE DRIVER (24K)	
29100-60024-A		HP2020 MAGNETIC TAPE DRIVER (24K)	
29100-60025-A		HP3030 MAGNETIC TAPE DRIVER (24K)	
29100-60048-A		HP2610/2614 LINE PRINTER DVR. (24K)	
29100-60049-A		HP7970 MAGNETIC TAPE DRIVER (24K)	
29100-60050-A		HP2762 TERMINAL PRINTER DVR. (24K)	
20209-60001-C		DAC LIBRARY	
29103-60001-A		SYSTEM CROSS LOADER (SXL)	
29103-60119-B		BCS GENERATOR (SXL-BCSGN)	
92401-60001-A		THERMOCOUPLE LINEARIZATION PACKAGE	
92402-60001-A		HUMIDITY PACKAGE	
92403-60001-A		STATISTICS PACKAGE	
92404-60001-A		CODE CONVERSION PACKAGE	
92405-60001-A		CRUVE FITTING PACKAGE	
92406-60001-A		INTERPOLATION PACKAGE	
92407-60001-A		INTEGRATION PACKAGE	
92409-60001-B		HP7210A PLOTTER LIBRARY	
09610-60017-A		ISA FORTRAN	
09610-60018-A		TABLE GENERATOR	

09610-60019-B  
 09610-60024-B  
 20810-60001  
 24150-60001-D  
 20072-60001-C  
 20075-60001-D  
 20077-60001-B  
 20337-60001-E  
 20338-60001-D  
 20339-60001-B  
 20341-60001-B  
 20344-60001-A  
 20348-60001-C  
 20349-60001-D  
 20411-60001-B  
 20429-60001-C  
 20430-60001-B  
 20436-60001-A  
 20530-60001-D  
 20583-60001-C  
 25154-60008-B  
 29005-60001-C  
 29006-60001-A  
 29023-60001-A  
 29024-60001-B  
 29025-60001-A  
 29026-60001-A  
 02313-62001-A

EVENT SENSE INTERRUPT HANDLER  
 EVENT SENSE  
 RTE/DOS PLOTTER LIB  
 RTE/DOS RFLOC. LIB. NON-EAU  
 VERIFY: DAC AXEPT  
 VERIFY: 2311A SUBSYS.(5410 A-D)  
 2312A SUBSYSTEM VERIFICATION TEST  
 DIAG.: 12604H DST  
 TEST: 2310C SUBSYSTEM  
 TEST: 2310A/B SUBSYSTEM  
 VERIFY: 2912 SCNR/DVM TEST  
 DIAG.: 10-BIT A-TO-D CARD 12564A  
 DIAG.: 40-BIT POS. TRUE OUTPUT REG.  
 VERIFY: 2911 SCNR/DVM TEST  
 TEST: KENNEDY 1406/1506 MAG TAPE  
 DIAG.: 2912A PROGRAMMER CARD  
 DIAG.: 2402A PROG. DATA INTERFACE  
 DIAG.: DVS PROGRAM CARD 12661A  
 VERIFY: 2321A SUBSYSTEM (3450/2911  
 CALIBRATION: 2311A (WITH ITY)  
 7970 9-TRACK DUMP/VERIFY PROGRAM  
 DIAG.: 12665-60001 INTERFACE  
 DIAG.: 12613-60001 INTERFACE  
 DIAG.: 12772 COUPLER MODEM INTERF.  
 DIAG.: 12773 COMPUTER MODEM INTERF  
 VERIFY: HP 2313B DUAL DAC  
 DIAG.: 40-BIT GND. TRUE OUTPUT REG  
 VERIFY: FOR 2313B SUBSYSTEM

# documentation

The following tables list all currently available HP 9600/9700 software manuals. This list supersedes the previous list in the **Communicator**. Copies of manuals and update packages can be obtained from your local Sales and Service Office. The address and telephone number of the office nearest to you are listed in the back of all reference manuals.

Customers in the U.S. may also order directly by mail. Simply list the name and part number of the manuals you

need on the Corporate Parts Center form supplied at the back of the **Communicator**. If you require an update package only send your request to:

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 Cupertino, Ca. 95014

## 9600/9700 SYSTEM MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
02005-90001	Real-Time Executive Software System	\$12.00	10/01/71	
02320-93002	RTE System Driver DVR76 for HP 2320A Low Speed Data Acquisition Subsystem Programming and Operating Manual	1.00	08/03/74	
02321-93001	RTE System Driver DVR74 for HP 2321A Low Speed Data Acquisition Subsystem Programming and Operating Manual	1.00	08/30/74	
02891-90014	RTE 2891A Card Reader Driver (DVR11)		04/ /71	
09600-93010	RTE System DVR11 for HP 2892A Card Reader Programming and Operating Manual	1.00	08/03/74	
09601-93007	RTE Device Subroutine for HP 5327A/B-H48 Counter	2.50	12/ /74	
09601-93009	RTE Device Subroutine for HP 5326A-H18 Counter	2.50	12/ /74	
09601-93014	RTE System Driver DVR15 Mark Sense Card Reader Programming and Operating Manual	1.00	08/30/74	
09611-90009	9611A Operating 406 Industrial Measurement and Control System		04/17/75	
12665-93001	RTE System Driver DVR65 for HP 12771A Computer Serial Interface Kit	1.00	08/30/74	
12989-99001	RTE System Driver DVA 15 for Card Reader Punch Subsystem 2894	1.00	01/25/75	
25117-93003	RTE System Driver DVR24 for HP 7970 Series Digital Magnetic Tape Unit	1.00	08/30/74	
29003-93001	RTE System Driver DVR66 for HP 12772A Coupler Modem Interface Kit Programming and Operating Manual	1.00	08/30/74	
29003-93003	RTE System Driver DVR66 for HP 12770A Coupler Serial Interface Kit Programming and Operating Manual	1.00	08/30/74	
29009-93001	RTE System Driver DVR62 for HP 23138 Subsystem	2.50	08/30/74	
29013-90001	DVR31 RTE Moving Head Driver	10.00	02/01/73	
29014-90001	Moving Head Real-Time System Generator		04/01/72	
29015-90001	Fixed Head Real-Time System Generator			
29016-90002	RTE Scheduler		09/01/72	
29016-90003	Real-Time Input/Output Control		09/01/72	
29022-90001	Real-Time Relocating Loader	10.00	06/01/73	
29028-95001	RTE HP 2610A/2614A Line Printer Driver	1.50	10/31/72	
29029-91001	Real-Time Executive Multiple-Device System Control Device (DVR00) Program Listing	10.00	09/ /72	
29029-95001	Real-Time Executive System Driver DVR00 for Multiple Device System Control Small Programs Manual	1.00	10/10/72	03/ /75
29033-98000	Real-Time Executive File Manager System	10.00	03/01/73	
29100-93001	RTE System Driver DVR40 (29100-60041) for HP 12604B Data Source Interface Programming and Operating Manual	1.00	08/30/74	
29100-93003	RTE System Driver DVR61 for HP 6940A, 6941A Bidirectional Multiprogrammer Programming and Operating Manual	3.00	08/30/74	
29101-93001	RTE Core-Based Software System Users Manual	5.00	08/01/73	
91060-93005	RTE Driver for X-Y Display Storage Subsystem (HP Model 1331C-016) Programming and Operating Manual	1.00	08/15/74	
91062-93003	Real-Time Executive System Driver for DVM/Scanner Subsystem	9.00	08/01/74	
92001-93001	Real-Time Executive II Software System	10.00	01/ /75	
92002-93001	RTE Batch-Spool Monitor Programming and Operating Manual	10.00	02/ /75	05/ /75
92200-93001	RTE System Driver DVR12 for HP 2607A Line Printer Programming and Operating Manual	1.00	08/30/74	
92200-93005	Real-Time Executive Operating System Drivers and Device Subroutine Manual	5.00	11/15/74	
92202-93001	RTE System Driver DVR23 for HP 7970 Series Digital Mag Tape Units Programming and Operating Manual	1.00	08/30/74	
93005-93005	Thermal Line Printer Subsystem for Driver DVR00 (RTE)	2.50	12/20/74	
93513-90002	RTE System Driver DVA 76-DVR40 for 2801 Quartz Thermometer Subsystem	1.50	04/30/75	

## SOFTWARE INPUT/OUTPUT SYSTEM MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
02100-90072	HP 2605A Console Printer Driver	\$ 1.00	3/72	
02116-91760	Teleprinter Driver (LP Compatible) Manual	1.00	8/73	

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
02762-90002	HP 2762A Terminal Printer Driver	1.00	5/73	
02892-90003	HP 2892A Card Reader Driver	1.50	6/72	
12602-90022	Mark Sense Card Reader Drivers	1.00	6/70	
12653-90004	HP 2767 Line Printer Driver	1.00	9/70	1/73
12845-90005	HP 2610A/2614A Line Printer Driver	1.00	2/74	
12987-90006	HP 2607 Line Printer Driver	5.00	11/73	
13022-90010	HP 7970 Magnetic Tape Unit Driver	1.00	2/72	
13029-90010	Magnetic Tape Driver (7-Track)	1.00	2/72	
5950-9276	SIO Drum-Disc	1.00	2/70	
5951-1374	Software Input/Output System Configuration	1.00	7/74	
5951-1390	Subsystem Operation	2.00	10/74	

## BASIC CONTROL SYSTEM MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
02100-90073	HP 2605A Console Printer Driver	\$ 1.00	3/72	6/72
02116-9017	Basic Control System Manual	8.50	12/71	
02762-90003	HP 2762A Terminal Printer Driver	1.00	5/73	
02892-90004	HP 2892A Card Reader Driver	1.50	6/72	
12602-90021	Mark Sense Drivers	1.00	6/70	
12653-90005	HP 2767 Line Printer Driver	1.00	10/70	
12845-90004	HP 2610A/2614A Line Printer Driver	1.00	6/72	
12987-90008	HP 2607 Line Printer Driver	5.00	12/73	
13023-90010	HP 7970 Magnetic Tape Unit Driver	1.00	5/74	
13026-90010	Magnetic Tape Driver (7-Track without DMA)	1.00	5/71	6/72
13027-90010	Magnetic Tape Driver (7-Track with DMA)	1.00	5/71	6/72
5951-1388	Generating HP Basic	1.00	5/71	
5951-1391	Basic Control System	1.50	10/74	

# training schedule

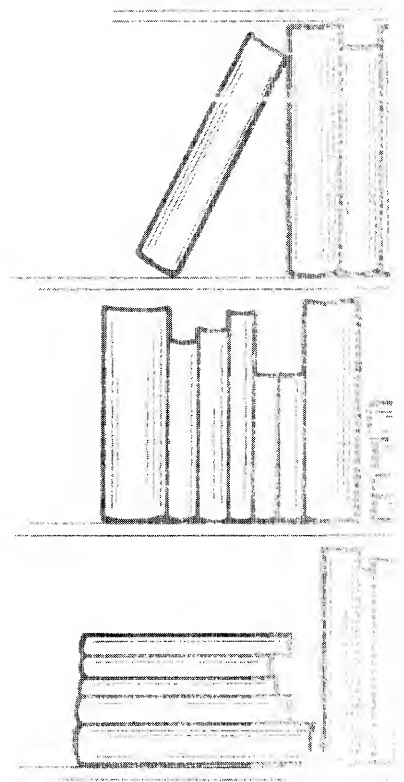
The schedule for training courses related to HP 9600/9700 systems is presented below. Included are courses scheduled for the next three months (October through December).



<b>COURSE NUMBER</b>	<b>COURSE TITLE</b>	<b>COURSE LENGTH</b>	<b>DATES</b>	<b>LOCATION</b>
SOFTWARE COURSES				
22965A	Real Time Measurement & Control	10 Days	Oct 6-17 Oct 6-17 Nov 3-14 Nov 3-14 Dec 1-12 Dec 8-19	Cupertino Rockville Cupertino Rockville Cupertino Rockville
22966A	RTE Operating System	5 Days		
	This course is separately available as a one week course. It is also the first week of the two week 22965A Real Time Measurement & Control course listed above.			
22967A	Batch Spool Monitor	3 Days		
	This course is separately available as a 3 day course. It is also the first 3 days of the second week of the 22965A Real Time Measurement & Control course listed above			
22968A	Measurement & Control Subsystem	2 Days		
	This course is separately available as a 2 day course. It is also the last 2 days of the second week of the 22965A Real Time Measurement and Control course listed above.			
22969A	Distributed Systems	5 Days	Nov 17-21 Dec 15-19	Rockville Cupertino
22950A	2100 Minicomputer Assembler	5 Days	Nov 17-21 Dec 1-5	Cupertino Rockville
22959A	21MX Minicomputer Assembler	5 Days	Oct 20-24 Oct 20-24 Nov 17-21 Dec 8-12	Cupertino Rockville Rockville Rockville
22974A	Minicomputers in Manufacturing	2 Days	Oct 16-17  Nov 24-25	Cupertino  Cupertino
HARDWARE COURSES				
22940A	2100A Operations & Maintenance	10 Days	Oct 6-17 Nov 3-14 Dec 1-12	Cupertino Rockville Cupertino
22941A	21MX Operations & Maintenance	5 Days	Nov 17-21 Dec 15-19	Cupertino Rockville
22942A	7900A Operations & Maintenance	5 Days	Oct 20-24 Dec 8-12	Cupertino Cupertino
22944A	7970E Operations & Maintenance	5 Days	Nov 3-7	Cupertino

# featuring -

## the HP contributed software center



The Contributed Software Center is composed of Hewlett-Packard's three contributed libraries; the 3000, the 2000 BASIC and the 2100-21MX. The Center serves as the administrator for the libraries, making a variety of computer programs available to all system users. Software is submitted to the Center which then prepares it for distribution. The preparation includes indexing programs according to their use or function, and pricing programs to cover costs. The Center also publishes library catalogs or handbooks which contain abstracts and/or documentation for all currently available programs.

Contributed software is written by users of HP systems and submitted to the Contributed Software Center for inclusion in the appropriate library. These programs range from complex data communications packages to educational games and apply to a wide range of HP systems. Before writing a program for your particular application, scan the catalogs or handbooks containing information on programs written for the system you are using. Some programs can be used without modification while other programs serve as a starting point for developing special purpose software.

New programs are welcome for consideration as entries to the 3000, 2000 BASIC, and the 2100-21MX Contributed Library. It is HP's opportunity to expand communication among HP computer system users. Minimum submittal requirements are: (1) machine readable source paper or magnetic tape (documentation should be contained in code when possible), (2) a typed and reproducible program documentation form (these forms are printed in contributed program catalogs and are also available on request from the Center), and (3) a contributed program library disclaimer.

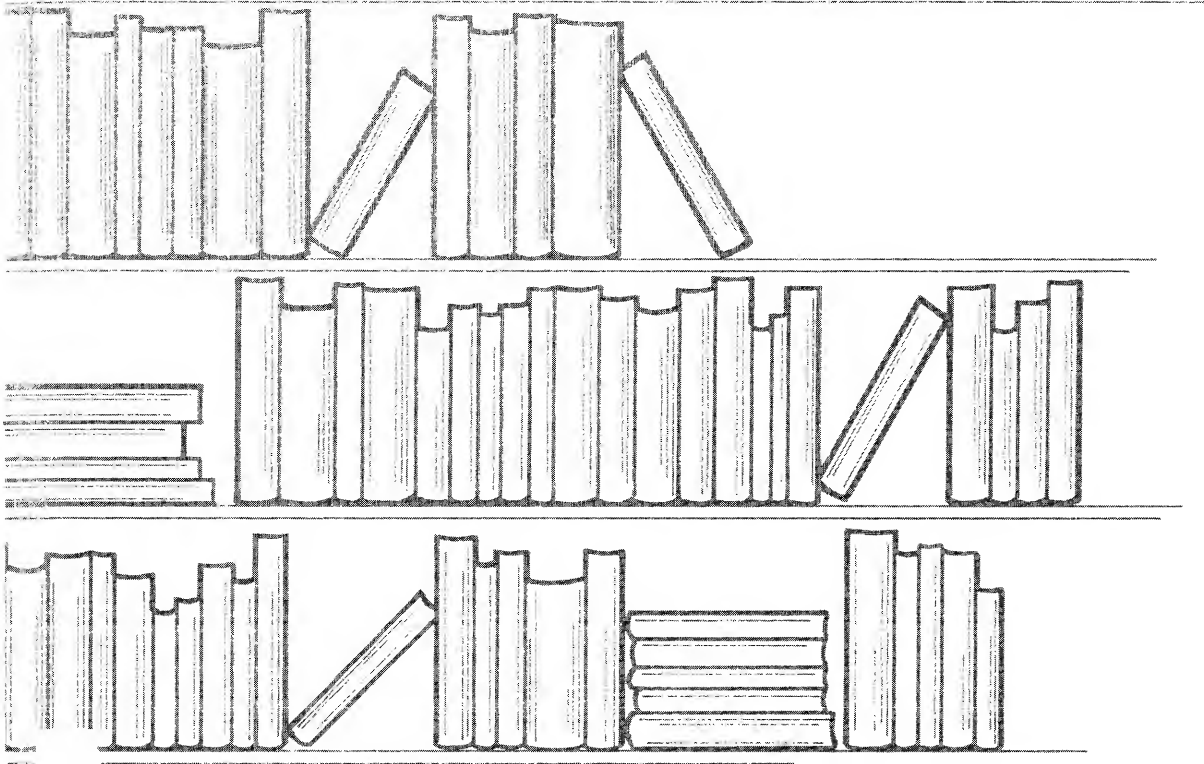
All program packages submitted to the Center should be wrapped securely and sent to:

Hewlett-Packard Contributed Software Center  
11000 Wolfe Road  
Cupertino, California 95014

Contributed software is checked by HP personnel; however it is impractical to test programs under all circumstances. Hewlett-Packard makes no warranty expressed or implied and assumes no responsibility in connection with the contributed program material. However, if you encounter an error, software report forms are supplied with library handbooks and catalogs. Fill them out and forward them to the Center.

Due to the rapid growth of library contributions it has been necessary to place an emphasis on including only programs of widespread usefulness. A Program Review Committee screens new submittals to determine this particular requirement.

QUIET PLEASE!



## HP 2000 BASIC CONTRIBUTED LIBRARY

This is the largest of the three libraries, cataloging over 800 programs. Library programs have been collected over a period of years and some of the earlier programs were written for a "single-terminal" BASIC system. In many cases slight modifications in coding are required to develop your own special-purpose software.

Programs written in BASIC are documented in 5 volumes, and an addendum, plus additional user manuals for certain individual programs. Each volume has a corresponding mag tape which contains the software. The volumes are organized according to subject classifications. You may wish to order several or all volumes. A direct mail order form included at the end of this publication may be used for domestic U.S.A. orders only, or contact your local HP sales office.

**Volume I** (100) Data Handling  
(200) Testing, Debugging and Programming Aids

Order Numbers:

Volume I (documentation) — 36000-91001,  
\$10

(Mag Tape)\* — 36000-10001,  
\$25

**Volume II** (300) Math and Numerical Analyses  
(400) Probability and Statistics  
(500) Scientific and Engineering Applications

Order Numbers:

Volume II (documentation) — 36000-91002,  
\$10

(Mag Tape)\* — 36000-10002,  
\$25

**Volume III** (600) Management Sciences and Operations Research  
(700) Business and Manufacturing Applications

Order Numbers:

Volume III (documentation) — 36000-91003,  
\$10

Mag tape,\* — 36000-10003, \$50

#### **Volume IV (800) Education**

Order Numbers:

Volume IV documentation, 36000-91004, \$15  
Mag tape\* 36000-10004, \$50

#### **Volume V (900) Games**

Order Numbers:

"What to do After You Hit Return",  
36000-91005, \$6.95  
Mag tape\* 36000-10005, \$25

#### **Addendum to Volumes I-IV**

Order Numbers:

Addendum documentation, 36000-92001, \$15  
Mag tape\* 36000-10006, \$50

Volume V, the games book, "What to do After You Hit Return" is a joint publication with the Peoples Computer Company located in Palo Alto, California.

\*800 BPI (1600 BPI magnetic tapes are also available upon request).

## **HP 2100/21MX CONTRIBUTED LIBRARY**

The 2100-21MX Contributed Library catalogs over 500 programs written in Assembly, Microprocessor Assembly, FORTRAN, and ALGOL. These contributed programs apply to a wide variety of systems based on the 2100-21MX series computers. The systems range from a CPU and teleprinter to a large disc-based configuration with a variety of computer peripherals and digital input/output instrumentation.

All currently available programs are listed in the 2100/21MX Contributed Library Program Catalog, order

number 22999-90040, priced at \$5.00. Unlike the HP 2000 BASIC volumes, complete documentation for each program is not in the catalog. Documentation software, and the catalog must be ordered through your local sales office or by using the Direct Mail Order form. Software abstracts of the programs which contain a brief description of the programs, any hardware requirements beyond the minimum system, and the source language are included in this catalog. Also included in the catalog is a price list which lists all available software options. A cross reference index in the catalog indexes programs by key words, and a classification code index lists all programs by major classification codes.

## **HP 3000 CONTRIBUTED LIBRARY**

This is the newest of the three contributed libraries. It was started several years ago but is now being reorganized to more closely fit the needs of the 3000 system user. Currently there are approximately 60 programs which will be included in the new HP 3000 Contributed Program Catalog scheduled to be released in November. The number used to order this catalog will be printed in the **Communicator** when it's available.

The distribution of the 3000 Contributed Library will be on magnetic tape only. Distribution is *not* by individual program. The requestor will receive all contributed software accumulated to date. When the library reaches a size that exceeds one 1200 foot reel of tape, the library will be available on a volume basis.

A Contributor Guide containing instructions for contributing to the 3000 Library and a contribution form is now available as order number 5952-5564. This guide can be ordered from the Corporate Parts Center. There is no charge for the Contributor Guide.

The HP 3000 contest is in full swing. Don't forget, if you would like to have a chance to win an HP-65, and share your programs with other 3000 system users, . . . send in those entries. Contest rules and deadlines are explained in the August 15th issue of the **Communicator**.

*Brenda Mapp  
HP Cupertino*

# software tips

## TIP ON USING THE HP 3000 TEXT EDITOR

Question! How do I list the contents of Z?

Answer! Use Q #Z: :#

```
:FILE L;DEV=LP
:EDITOR *L
```

```
HP32201A.4.02 EDIT/3000 WED, SEP 10, 1975, 4:26 PM
/Z::=
ENTER Z::=
Z CAN CONTAIN ANY "TEXT", CHARACTERS, OR COMMANDS
/Q#Z::#
Z CAN CONTAIN ANY "TEXT", CHARACTERS, OR COMMANDS
```

Remember any special character except -+/( ) . , ; ' & can be used to delimit strings.

If Z contains the delimiter the display will only be up to the delimiter.

```
/Q"Z::"
Z CAN CONTAIN ANY
/E

END OF SUBSYSTEM
```

*Dick Sleight  
HP Cupertino*

## RETRIEVING EDITOR WORK FILES AFTER A SYSTEM CRASH

As most 3000 users know by now, the EDIT/3000 subsystem saves the contents of the user's work area in a file generally named Kdddtttt where ddd is the day of the year and tttt is the time. When the system crashes or the user aborts the EDIT/3000 subsystem, this "k" file is saved in an attempt to preserve the user's work.

However, the various types of system crashes possible makes it difficult to predict the exact state of the work file. Forward and backward pointers are stored in the file and if a block was not yet updated when the crash occurred, the pointers may be invalid.

There are certain techniques that *may* help you recover all or most of your work files. Follow this sequence of steps after you have logged on to the system.

- Identify the workfile with a :LISTF ,2 command.
- Enter the EDITOR.

- Activate the file as a workfile using the TEXT command.
- Assure yourself that the workfile belongs to you and that its linkages are intact in both the forward and backward directions. LIST ALL can be used to check the forward pointers. To check the backward pointers, SET TIME equal to the number of records in the file then use WHILE FLAG; LIST \*-2.
- If the forward and backward are intact, KEEP the file (do *not* use KEEPPQ).
- TEXT your workfile into the EDITOR; it should be in good order.

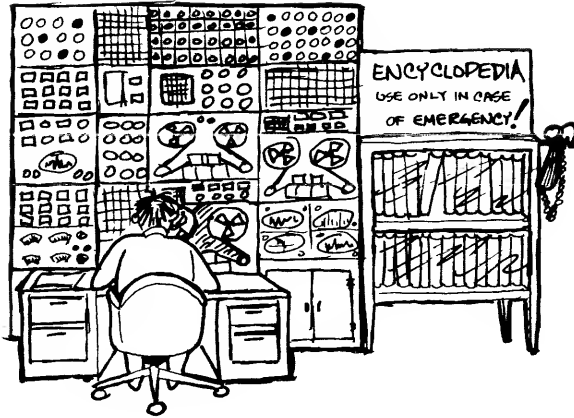
Suppose, however, at the time of the crash, the last block (containing pointer information) was not written out. The LIST ALL fails near the end of the file. One solution might be to do a partial KEEP: that is, KEEP with a range that ends just before the line that couldn't be listed. Then TEXT the file in and fix up last lines. Another possibility (providing it's not essential to preserve your line numbers) would be to HOLD the lines that are OK, do a DELETE ALL (this is important), and then ADD from the HOLD file. This will set up a new work file and the lines will be renumbered.

In the case where backward pointers are correct but the forward pointers are not, do a FIND LAST (if possible), or whatever you can do to get to the end of the file. Then set TIME equal to the number of records in the file and use the following:

```
/W
/FQ *
/BEGIN
/HQ*,APPEND
/FQ*-1
/END
```

This will store the records in the HOLD file in reverse order. Then DELETEQ ALL and ADD from the HOLD file. The file will be in reverse order and repeating the process will restore it to its original form.

When there's a "hole" in the file, that is, a few lines in the middle of the work file are not accessible, a partial keep (i.e., KEEP using a range) of the beginning part and then



the end part can help save most of the file. (Similarly, multiple KEEP's using ranges can help get around multiple "holes." Do a TEXT of the first part kept and then JOIN the other part(s). A key point to keep in mind is that an ADD after a DELETE ALL will set up a new work file; a TEXT command always sets up a new work file.

*Madeline A. Lombærde  
HP Cupertino*

## LOGICAL VARIABLES IN BASIC/3000

It is sometimes convenient to READ files containing logical data with the 3000 BASIC Language, although it does not support this variable type.

Limited support is afforded by the following user-function which converts a logical number, READ into an integer variable, to floating point.

```
DEF REAL FNL (INTEGER X)
REAL Y
IF UND (X) THEN RETURN 32768
Y = X
IF Y < 0 THEN Y=Y + 65536
RETURN Y
FNEND
```

*Cliff Jager  
HP Cupertino*

## SPOOLING AND JOB MANAGEMENT NOTES

This is the second in a series of separate articles related to Spooling and Job Management. The first article titled "User Facilities" was published in Issue 2 of the **Communicator**.

The subject of the third article will be Installation Management. Covered in this article are Console Commands and Device Operation.

### Installment 2: Console Commands and Device Operation

#### 1. Console Commands

##### 1.1 =ABORTIO – for Deallocation

See Note 2.5.3.

##### 1.2 =ALTFILE – Changing Output Priority

When the output priority and/or device of an output spoolfile is changed, the spoolfile is placed as the last spoolfile among all those of the new priority and/or device. For example, =ALTFILEing an output spoolfile's OUTPRI to its current value will result in placing it at the end of its current priority group.

##### 1.3 =ALTFILE – Changing Number of Copies

When an OPENED, output spoolfile's NUMCOPIES is =ALTFILED, the new value may be overridden by a higher value supplied by a subsequent re-allocation (FOPEN) by the job/session.

##### 1.4 =DOWN – for Deallocation

See Note 2.5.2.

##### 1.5 =JOBFENCE/=OUTFENCE – Following WARM-START

See Note 3.3 of Installment 3 in the next issue of the **Communicator**.

##### 1.6 =LIMIT – Limiting Job/Session Concurrency

See Note 5 of installment 3 in the next issue of the **Communicator**.

##### 1.7 =LOGOFF – Comparison to Version B

In MPE C the =LOGOFF command operates somewhat differently than in MPE B. The current =LOGOFF console command is equivalent to a =LIMIT 0,0 followed by an =ABORTJOB for all executing and suspended jobs/sessions. This does not guarantee that no one will be able to logon to MPE since system managers and system supervisors can specify HIPRI.

##### 1.8 =SHOWIN/=SHOWJOB/=SHOWOUT – Status Displayed

These console commands display information reflecting the status at the time the command was accepted: not at the time the information is printed.

### 1.9 =SHOWIN/=SHOWOUT – New Options

A new qualifier option was added to the =SHOWIN and =SHOWOUT commands that is not in the manual:

SP – specifies to only display spoofoes.

### 1.10 =SHOWOUT – Displaying Classes

When a device class is specified with the DEV= keyword of =SHOWOUT, spoofoes destined for that particular class are displayed in addition to those destined for a specific device in the class. Spoofoes destined for other classes will not be displayed even for classes which overlap or are a subset of the original class specification.

### 1.11 =SPOOL – Controlling the ACTIVE Spoofoe

When applying an =SPOOL directive to the ACTIVE spoofoe, care must be taken that it is still ACTIVE when the command is executed: a subsequent spoofoe may have become ACTIVE by the time the carriage return is entered on the console. In the case of input, the problem is compounded because the spooler's reads are buffered, so that you may actually be affecting the previous spoofoe. As a practical remedy, it is suggested that the spoofoe be placed off line (and, for input, wait a short period of time) before issuing the command.

### 1.12 =SPOOL – New Option

A new ACTIVE spoofoe option is in the output version of the =SPOOL command that is not in the manual:

```
... {,DELETE}
      {,DEFER}
      {,RESET}
```

RESET – specifies that outputting of the ACTIVE spoofoe is to be discontinued by returning it to the READY state without deferring it. Unless there is another READY file of equal or higher priority, it will be restarted immediately. This option is useful when paper re-alignment is required (see Note 2.4), or when the output spoofoe breaks down during output.

### 1.13 =SPOOL – OPENQ/SHUTQ Explanation

The MPE C manual does not include an explanation of the OPENQ and SHUTQ options of =SPOOL. The following paragraph should be inserted in section 6-17 of the MPE Console Operator's Guide following the description of the DEFER option:

Virtual Access Control – The above six directives control the spoolers and the spoofoes on which they operate. The operator can enable/disable the users' ability to generate output spoofoes for each spoolable output device independent of the spooler's ownership of the device. Thus, "output queuing" can be enabled for a device that is not presently owned by a spooler. Conversely, an

output spooler can be processing a queue of READY spoofoes while generation of new spoofoes for that device is barred.

### 1.14 =SPOOL – Deferring ACTIVE Spoofoes

When an ACTIVE spoofoe is explicitly deferred with the =SPOOL command, the *devicefileid* is not displayed. Since it must be known in order to "undefer" the spoofoe, it should be obtained by using =SHOWOUT or (preferably) by actual examination of the header or trailer after the command is issued.

### 1.15 =SPOOL – Command Rejected for "Available" Input Device

See Note 2.5.

## 2 Device Operation

### 2.1 Operator Device Assignment

#### 2.1.1 "Unanticipated" Allocation Requests

Unanticipated allocation requests can be understood by analyzing the requestor's allocation request. See Notes 3.1 and 3.2 of installment 1 in the previous **Communicator**.

#### 2.1.2 Allocation to Partially-spooled Classes

When a class is configured such that some devices in it are spooled and some aren't, NEW allocations will prefer available real devices to spooled devices.

#### 2.1.3 FORMS Allocations

When a spooler requests device assignment in a class for a spooled FORMS file, and another spoofoe is chosen, the file is placed at the end of the priority group in the new spoofoe's READY queue. This is similar to the action taken by =ALTFILE, see Note 1.2.

#### 2.1.4 Spooler Selection on FORMS Device

The determination of where to print which spoofoe is made without regard to whether FORMS are currently mounted on any device. Specifically, the operator may be asked to mount standard forms on a device currently carrying FORMS even though another acceptable spoofoe is available. If the file is class-destined, then the operator can, of course, redirect the spoofoe to another ("unFORMSed") printer.

### 2.2 Headers and Trailers

#### 2.2.1 No Trailer

A trailer will not appear with an output line printer or card punch file if:

- The system crashes prior to printing the trailer.
- (If spooled) A spoofoe (device) error is detected. (See also, Notes 2.3 and 2.4)

## 2.2.2 Card Punch Headers and Trailers

Card punch files are bounded by headers and trailers. These cards can be distinguished when thumbing through the punched output by their trailing "3 stripes" (12, 8, 3 punch; ASCII period). Further information is provided by preceding these stripes with the numeric part of the generating job/session's *jobnumber*; each digit appearing in seven contiguous columns for ease in identification without interpreting the card. This is preceded by the full *jobnumber*, the *devicefileid*, and filename, which can be read by interpreting the card.

## 2.3 "Program-generated Spoofer Errors"

Certain illegal FWRITE and FCONTROL controls are detected by the I/O driver rather than the file system. These are returned as I/O errors. When a device is not spooled, such I/O errors are returned immediately to the program. When the device is spooled, however, no error is returned. Rather, the I/O error is returned to the spooler when the file is output. Such "program-generated" I/O errors appear as the following console message which should be added to the MPE Console Operator's Guide:

```
SP#ldn/#Odevicefileid DEFERRED, SPOOLEE IO
ERROR. The output spooler on logical device
number ldn has deferred the spoofer with device
file identification #Odevicefileid, because the
spoofer contains a request for an operation which
is rejected as invalid by the spooler or its I/O
driver.
```

## 2.4 Action on Spooler I/O Errors

It should be noted that when a spooler detects an I/O error on the spooler, its action is equivalent to:

```
=SPOOL ldn, STOP, RESET, OPENQ
```

That is, the queue is not SHUT, thereby allowing spooled access to the device.

## 2.5 "Hung" Devices

It may sometimes appear that a card reader, line printer, or other device becomes "hung-up"; either unavailable to console commands (e.g., =SPOOL, =DOWN) or nonresponding to an I/O request. =SHOWDEV is useful in determining the status of a device. If it displays "AVAIL", then device ownership is not the problem. These occurrences can often be minimized by adhering to some simple operational procedures:

### 2.5.1 Card Readers – Physical End-of-File

The card reader EOF button causes the requestor to receive a physical end-of-file indication following the last card. (The 2894 Printing Reader/Punch does not have an EOF button but a card containing :EOF: in

columns 1-5 will perform the same function.) For system requestors, such as spoolers and DEVREC, this indicates that the entire input stream is completed; it also serves as a delimiter for user requests. Using the card reader EOF to delimit input is strongly encouraged for the following reasons.

#### 2.5.1.1 EOF for Nonspooled Card Readers

When a nonspooled, accepting card reader is not allocated to a user, MPE's device recognition facility (DEVREC) is responsible for scanning for a legitimate :JOB or :DATA command. DEVREC stops reading only when it detects a physical end-of-file (see above) or an I/O error. The device will not be available for operator allocation, =SPOOL, =DOWN, etc. until DEVREC receives this end-of-file (or an error). The indication that DEVREC owns the device is a =SHOWDEV display of:

```
Idev { J }
      { D } UNAVAIL SYS
      { A }
```

See Note 2.5.3 for a way of clearing this situation.

#### 2.5.1.2 EOF for Delimiting JOB Decks

It is good to use card reader EOF when submitting JOB decks in order to provide a definite JOB end. A JOB's :EOJ command may be omitted or misapplied (if it is interpreted as a program's \$STDIN EOF due to omission of :EOD, for example). When this happens on a nonspooled device (without physical EOF), it will keep the device allocated to the last JOB. Even worse, when :EOJ is omitted for the last JOB on a spooler, the JOB will not be scheduled. Physical EOF guarantees that the JOB is delimited.

## 2.5.2 Inoperational (Powered Off) Devices

Certain devices, when inoperational, will exhibit very anomalous behavior that can be difficult to analyze. For example, a powered off line printer can wait indefinitely for a print request to complete, or accept print requests seemingly successfully. Both these examples will occur without indication to the user or operator. For these reasons, it is important to ensure that every device is fully operational or =DOWN.

### 2.5.3 "Unhanging" Devices

There are several reasons that a device can become "hung". In addition to the situations described above, a device can break during the processing of a file. All those result in I/O pending on a device without it being able to be satisfied (i.e., "hung"). In order to overcome these situations, =ABORTIO should be used in order to reject all currently pending requests. This will normally cause the requestor to abort the operation. For example, DEVREC will release the device. Thus, =ABORTIO can be used to get the device deallocated by rejecting pending I/O. If the device is broken, it's best to =DOWN the device before issuing the



=ABORTIO. Although the "hung" requestor may release (e.g., FCLOSE) the device on the first detected error, succeeding I/Os may be issued by other deallocate functions ignorant that the operator is trying to release the device because it is non-responding. Therefore, =ABORTIO may have to be issued several times before the device is released; if it was =DOWNed, the down message will be printed when it is fully deallocated. As an example of "clean up" I/Os, consider a JOB's nonspooled \$STDLIST line printer failing. =ABORTIOs will have to be issued for the hung request, but also for all the JOB termination messages that are attempting to be printed.

## 2.6 Paper Realignment on Spooled Line Printers

When line printer re-alignment is required on a spooled line printer (e.g., bad placement following paper out), the following can be performed:

- Manually reset the printer. This is a good policy whenever you wish to stop a device quickly while you fumble with the correct command.
- =SPOOL *Idev*,WAIT,RESET  
This WAITs the spooler so that paper can be realigned while "backspacing" the file.
- Correct the alignment. This may be a simple matter of adjusting top-of-form with a page eject.
- Ready the printer.
- =SPOOL *Idev*,RESUME  
This restarts the spooler.

If the file contains ejects, it will soon fall into alignment by itself. If it doesn't, the correct alignment must be done visually/manually as the file is being printed. In this case, nothing may be done at step c except to allow the spooler to "backspace" the file.

Look for the article on Installation Management in the next issue of the **Communicator**.

# bulletins

## HP 3000 SOFTWARE POCKET GUIDE

A new *HP 3000 Software Pocket Guide* is now available. The manual is ideal for reminding users at the terminal of correct command syntax and special debugging features. This document replaces and expands the *HP 3000 Software Reference Card*, and includes the syntax for:

- All MPE Commands (User, System Manager and Supervisor, and Console Operator).
- All file system and most other intrinsics.
- MPE error numbers and their meanings.

- Commands for using the 2780/3780 Emulator, EDIT/3000, FCOPY/3000, and DPAN/3000 (Dump Analyzer).
- Compiler Subsystem Commands.
- HP 3000 Instruction Set
- Other useful information.

The manual is 130 pages long, fits in a pocket, and sells for \$3.50. The HP part number is 03000-90126.

Dix McGuire  
HP Cupertino

# software updates

## MPE 32000C.00.08

This note, along with the August MIT, Date Code 1537, comprises the official release of MPE 32000C.00.08.

### 1. Module Changes CO.0X

	1	2	3	4	5	6	7	8
INITIAL	0	X		X	X		X	X
SYSDUMP	1	X	X	X		X		X
SEGPROC	2	X	X			X		
SEGDVR	3							
DISPATCH	4			X		X		
LOAD	5		X					
MAPP	6				X			
UCOP	7	X						
DEVREC	8							
PROGEN	9	X						X
ININ	10				X		X	
EXIN	11	X	X	X	X	X	X	
LOG	12	X						
IOPTRD0	13							
IOPTPN0	14					X		X
IOPL0T0	15							
IOMDISK0	16			X			X	X
IOFDISK0	17			X			X	X
IOTAPE0	18			X				X
IOLPRTO	19							
IOCDRD0	20		X			X		
IOCLTTY0	21							
IOTERM0	22							
IOCDPN0	23							
IOPRPN0	24				N	X		
IOREM0	25							
IOBSC0	26							
IOMDISK1	27	X		N			X	X
PFAIL	30			X	X	X		
FILESYS	50	X	X	X	X	X	X	X
COMM'INT	51	X		X		X		
STORE/RESTORE	52			X		X		X
DIRC	53							
ALLOCATE	54		X		X			X
DISKSPC	55	X						
MMCORER	56					X		X

1 2 3 4 5 6 7 8

MMDISK	57								
ABORT	58						X	X	
MESSAGE	59							X	
CROUTINE	60			X	X				
IOUTILITY	61	X		X	X			X	X
TTYINT	62		X	X	X			X	
PCREATE	63	X							
MORGUE	64			X					
PROCMail	65								
PINT	66						X		X
DATASEG	67	X							
IOPM	68		X			X			
CHECKER	69								
UTILITY	70	X	X	X		X			
SEGUTIL	71	X		X				X	
LOADER1	72		X	X					X
RINS	73						X		
JOBTABLE	74	X							
DEBUG	75	X							
NURSERY	76			X					
SYSDPLY	77						X		
FIRMWARESIM	78	X							
SPOOLING	79			X	X			X	X
SPOOLCOMS	80	X					X		X
MESSAGE CAT				X			X	X	X

## 2. Problems Solved in MPE C.00.08

- A test is now made to prevent headers, trailers, and alignment records from being printed beyond the configured record width of the line printer. Formerly, 132 characters were printed regardless of record width.
- When using the paper tape punch in binary mode, the driver will no longer append a carriage return and line feed to each record.
- A multiprogramming error that gradually locked out terminals has been fixed.
- A problem whereby an SIO device in DRT 4 prevented the system from running has been fixed.
- :STORE and :RESTORE have been modified so that, if a stack overflow occurs when they are being executed via the COMMAND intrinsic, the user's program will be aborted instead of causing a SYSTEM FAILURE #030.
- A multiprogramming error that caused a terminal to be locked out after an abort has been fixed.

- A problem that caused an "STT UNCALLABLE" abort when using a privileged, uncallable control Y procedure has been fixed.

## 3. Enhancements to MPE C.00.08

### a. =BREAKJOB/=RESUMEJOB Commands

Two new console operator's commands have been added to allow suspending and resuming jobs:

=BREAKJOB #Jnum to suspend an *Executing* job

=RESUMEJOB #Jnum to resume a *Suspended* job

Where *jnum* is the MPE assigned job number.

An \*INVALID\* message will be returned for any of the following reasons:

- Trying to break an introduced, suspended, waiting, or completed job.
- Trying to resume an introduced, executing, waiting or completed job.
- A syntax error in either command.
- A request to break or resume any session or a nonexistent job.

Any executing job may be suspended, including spooled and streamed jobs. A job that is holding a critical system resource, such as a SIR, will be allowed to continue running until it releases the resource, at which time it will be suspended.

All commands that normally function on, or pertain to executing jobs, such as =ABORTJOB, will be operative on suspended jobs.

If a request is made to suspend a job that owns a non-sharable device, such as a tape drive, a console message will be issued to inform the operator that the job owns the device. Up to ten non-sharable devices can be listed. The operator may then decide if the job should be allowed to run until it releases the devices, or if it should be aborted.

When a suspended job is resumed, it will continue execution as if it had never been suspended. No message is issued when a suspended job is resumed.

A fourth job state, SUSP, has been added to the SHOWJOB listing. This job state identifies jobs that have been suspended with the =BREAKJOB command. SUSP may also be used as a qualifier in the SHOWJOB command. For example, =SHOWJOB SUSP will display all suspended jobs present in the system.

b. Segmenter Error messages

The Segmenter subsystem has been revised to make its error messages more meaningful. The syntax adopted, as well as the actual error messages are described under section 5 of this article.

c. Magnetic Tape Read Error Recovery

A new algorithm has been implemented for retrying tape read errors. This technique has proved significantly more successful in recovering tape read errors on marginal tapes than the previous method. The new algorithm will retry ten times and then begin backspacing and forwardspacing up to ten records retrying the read ten times after each backspace and forwardspace operation

d. Protected Tracks on 7905 Discs

The driver for the 7905 disc has been modified to protect vital system information on the disc. An attempt to write on a protected track will cause a SYSTEM FAILURE #053. For system discs the protected tracks are 0 through 29 except tracks 1 and 18. For user discs, only track 0 is protected.

e. :STORE and :RESTORE Enhancements

A new optional parameter, FILES=*maxfiles*, has been added to the :STORE and :RESTORE commands. This parameter allows the user to specify the maximum number of files to be stored or restored. If omitted, the value 2000 is used by default. This parameter is used to determine the size of the command's internal work files, CANDIDAT, GOOD, and ERROR. For syntax details, see section 5 of this article.

4. Known Problems in MPE C.00.08

- a. Closing a tape file with NO REWIND is not implemented.
- b. FSPACE spaces tape files by blocks rather than by records.

- c. Chained SIOs on magnetic tape do not perform correctly, causing transfer of blocks larger than 4096 words to fail if the record format is variable or undefined.
- d. The character ":" is treated as an EOF on \$STDINX.
- e. The commands: LISTACCT, LISTGROUP, and LISTUSER can lock the directory indefinitely if the output is written to magnetic tape and the tape is not ready.
- f. Input arguments to the intrinsic BINARY of 65536, 65537, 65538, and 65539 fail to return overflow.
- g. If the FORMSG parameter of FOPEN begins on an odd byte boundary, the preceding byte is also printed.
- h. Lower case :eod is not recognized as an end-of-file on data accepting devices.
- i. Issuing a :DEALLOCATE command for a non-existent program file returns an ERR 217. The error should be ERR 217,52. The 52 is the file system error number returned from FCHECK.
- j. DEBUG break points cannot be set in dynamically loaded procedures except by specifying the physical CST numbers.
- k. When DPAN finds that the PCB table has been filled, it prints the erroneous messages "INVALID FIRST UNASSIGNED ENTRY" and "INVALID BACKWARD SUBQUEUE POINTER" even though there is no error in the PCB.
- l. When the maximum number of open spoolfiles is not sufficient to handle all spooling requirements, spooled JOBS may cause endless numbers of null list files to be generated. This bug manifests itself as multiple \$STDLIST files for a single JOB, each producing only a header and trailer. If the line printer is spooled, this results in many null spoolfiles, each using four sectors of disc space. If the line printer is not spooled, these null spoolfiles will begin printing immediately unless the printer is not ready. In this case, the system will crash due to an IOQ overflow. If an open spoolfile is closed during this resource allocation loop, the job may be launched normally. In this case, the last spoolfile for \$STDLIST will be the true job listing.

This bug can be overcome by increasing the maximum number of open spoolfiles. The recommended value is 20, but a more exact figure can be found by examining the usage of your system. Each initial allocation (FOPEN) of a spooled device uses one open spoolfile. When the file is closed (FCLOSE), the spoolfile becomes unopened.

For example:

A SESSION's single access to a spooled line printer requires one opened spoolfile; a spooled JOB requires at least two, one for \$STDIN and one for \$STDLIST. Each additional access to a file of device class LP requires an additional open spoolfile.

One indication that the limit is being reached is allocation failures for spooled devices.

## 5. Documentation Changes

- a. MPE/3000 OPERATING SYSTEM REFERENCE MANUAL Part number 32000-90002

page 5-35

The syntax of the STORE command is:

```
:STORE [ fileset ] ; tapefile [;SHOW]
[;FILES=maxfiles]
```

page 5-36

After the description of the SHOW parameter, insert:

***maxfiles*** The maximum number of files that may be stored. If omitted, the number 2000 is used by default.

page 5-40

The syntax of the RESTORE command is:

```
:RESTORE tapefile [;[fileset] [;KEEP]
[;DEV=device] [;SHOW] [;FILES=maxfiles] ]
```

page 5-41

After the description of the SHOW parameter, insert:

***maxfiles*** The maximum number of files that is to be restored. If omitted, the number 2000 is used by default.

page 7-27

Segmenter error messages

Segmenter error messages are in the following format:

```
{ *** ERROR *** } [ numericparm ]
{ *** FILE ERROR *** } [ stringparm ]
{ *** WARNING *** }
```

ERROR #*msgnum* *message*

The following is an example of a message containing all optional parameters:

```

numericparm      stringparm
FCHECK value      file name
***FILE ERROR 40 AUX. USL FILE
ERROR #84 UNEXPECTED I/O ERROR
      msgnum      message
```

Below is a list of the error numbers and messages for all Segmenter process errors.

NUMBER	ERROR MESSAGE	COMMENTS
0	ILLEGAL ENTRY	Bad USL generated by compiler. <i>numericparm</i> is the decimal address of the entry in the USL.
1	ILLEGAL HEADER	Bad USL generated by compiler.
2	ATTEMPT TO EXCEED MAXIMUM DIRECTORY SPACE	USL file maximum directory size is %77777.
3	AVAILABLE DIRECTORY SPACE EXHAUSTED	USL file is too small or compiler error.
4	AVAILABLE INFO SPACE EXHAUSTED	USL file too small or compiler error.
5	USL FILE NOT DESIGNATED	Tried to -USE, -PREPARE, -NEWSEG, -LISTUSL, -COPY, -ADDRL, -ADDSL, -HIDE, -REVEAL or -PURGERBM without specifying -USL.
6	ILLEGAL USL FILE SPECIFICATION	USL file length is less than 5 records or greater than 32767 records.
7	UNABLE TO OPEN USL FILE	FOPEN failure in -AUXUSL, -BUILDUSL, or -USL. <i>numericparm</i> is FCHECK value.

NUMBER	ERROR MESSAGE	COMMENTS
8	INVALID USL FILE	File code is not USL or USL file is bad.
9	UNABLE TO CLOSE USL	FCLOSE failure during -EXIT. <i>numericparm</i> is FCHECK value.
10	UNABLE TO CLOSE SL FILE	FCLOSE failure during -EXIT or on previous SL during -SL. <i>numericparm</i> is FCHECK value.
11	AVAILABLE FILE SPACE EXHAUSTED	RL or SL file is full.
12	ENTRY POINT ALREADY DEFINED	<i>stringparm</i> is entry name.
13	SEGMENT CONTAINS PROGRAM UNITS OTHER THAN PROCEDURES	Outer block is present. For SPL, recompile subprogram.
14	SEGMENT REQUIRES GLOBAL STRING	FORTRAN DATA, or SPL GLOBAL or OWN variables were specified. <i>stringparm</i> is entry name.
15	SEGMENT ALREADY DEFINED	-ADDSL <i>segname</i> and <i>segname</i> already exists. <i>stringparm</i> is <i>segname</i> .
16	SL FILE NOT DESIGNATED	Tried to -PURGESL, -ADDSL, or -LISTSL with no SL file open.
17	ILLEGAL SL FILE SPECIFICATION	SL file length is less than 4 records or greater than %77777 records.
18	UNABLE TO OPEN SL FILE	FOPEN failure during -BUILDSL or -SL. <i>numericparm</i> is FCHECK value.
19	INVALID SL FILE	
20	ILLEGAL RL FILE SPECIFICATION	RL file length is less than 4 records or greater than %77777 records.
21	RL FILE NOT DESIGNATED	Tried to -ADDRL, -LISTRL, or -PURGERL without opening RL.
22	INVALID RL FILE	File code is not RL or RL file is bad.
23	UNABLE TO CLOSE RL FILE	FCLOSE failure on RL file. <i>numericparm</i> is FCHECK value.
28	PROCEDURE HAS NO USABLE ENTRY POINT	
30	UNABLE TO OPEN RL FILE	FOPEN failure. <i>numericparm</i> if FCHECK value.
32	INVALID PROGRAM FILE	File code is not PROG.
33	ILLEGAL CAPABILITY SPECIFICATION	Program capability specification is greater than the user's.
34	MORE THAN ONE EXTENT USED	Not all code is in one extent. Program will not run unless code is contiguous on disc. Build a new program file.
35	NO PROGRAM TO PREPARE	No program in USL.
36	UNABLE TO CLOSE PROGRAM FILE	FCLOSE failure. <i>numericparm</i> is FCHECK value.
37	UNABLE TO OPEN PROGRAM FILE	FOPEN failure. <i>numericparm</i> is FCHECK value.
38	DATA SEGMENT OVERFLOW	Data is greater than %37777 words.

NUMBER	ERROR MESSAGE	COMMENTS
39	TOO MANY CODE SEGMENTS	More than 255 segments.
40	CODE SEGMENT OVERFLOW	Code segment is greater than %37774.
41	STT OVERFLOW	Too many PCAL instructions. <i>stringparm</i> is entry name where overflow occurred.
42	SEGMENT HAS NO USABLE ENTRY POINT	
43	UNABLE TO ACCESS PROCEDURE	Illegal P-Label or params not matching.
44	REQUIRES PRIVILEGED MODE CAPABILITY	User needs privileged mode capability to add privileged segment.
45	ACTUAL PARAMETERS INCOMPATIBLE WITH FORMAL PARAMETERS	(FORTRAN program) <i>stringparm</i> is procedure name.
46	PROGRAM UNIT CONTAINS FATAL ERROR	<i>stringparm</i> is unit name.
47	PROGRAM UNIT CONTAINS NON-FATAL ERROR	<i>stringparm</i> is unit name.
48	CODE SEGMENT MAY BE TOO LARGE	
60	NO OUTER BLOCK IS ACTIVE	
61	MORE THAN ONE OUTER BLOCK IS ACTIVE	
62	MORE THAN ONE OUTER BLOCK HAS ACTIVE ENTRY POINTS	
63	EXTERNAL VARIABLE NOT DECLARED GLOBAL	<i>stringparm</i> is variable name.
64	EXTERNAL VARIABLE INCOMPATIBLE WITH GLOBAL VARIABLE	<i>stringparm</i> is variable name.
66	TOO MANY COMMON DATA LABELS	(BASICOMP or FORTRAN program) program must be re-coded.
67	COMMON DECLARED WITH DIFFERENT SIZE	<i>stringparm</i> is common name.
68	ATTEMPT TO USE BLOCK DATA ON NON-EXISTENT COMMON	(FORTRAN program)
69	ATTEMPT TO USE BLOCK DATA ON INCOMPATIBLE COMMON	(FORTRAN program)
70	ILLEGAL STACK SIZE	Stack size less than 0.
71	ILLEGAL DL SIZE	DL size less than 0.
72	ILLEGAL MAXDATA SIZE	MAXDATA less than 0.
80	INSUFFICIENT STORAGE	Could not obtain enough DL area (system problem). Program is too large for the segmenter. SEGPROC must be prepared with larger DL.
81	ILLEGAL PATCH	Bad FORTRAN compiler.

NUMBER	ERROR MESSAGE	COMMENTS
82	UNABLE TO OPEN SCRATCH FILE	Scratch area used to prepare code from USL before moving to SL file. <i>numericparm</i> is FCHECK value.
83	UNABLE TO OPEN LIST FILE	FOPEN failure. <i>numericparm</i> is FCHECK value.
84	UNEXPECTED I/O ERROR	<i>numericparm</i> is FCHECK value and <i>stringparm</i> is file type. Files opened are: USL, AUX USL, SL, RL, RL LIBRARY, PROGRAM, LIST and SCRATCH files.
86	ITEM DIFFERENT FROM CLASS SPECIFICATION	One of the following occurred: 1. Tried to -COPY an item of a different class than specified. 2. Tried to -PURGERBM an item that differs in class specified. 3. Tried to -USE item with a class that differs from that specified.
87	ITEM NOT PRIMARY ENTRY POINT	Tried to -ADDRL an item that is not a primary entry point.
88	INCOMPATIBLE ITEM TYPE	One of the following occurred: 1. Tried to -HIDE an item that is not an entry point. 2. Tried to -NEWSEG an item that is not a procedure. 3. Tried to -PURGERBM an item that is not a UNIT.
89	INVALID CLASS SPECIFICATION	One of the following occurred: 1. Tried to -COPY an ENTRY; 2. Tried to -PURGERL a SEGMENT. 3. TRIED TO -PURGESL a UNIT.
93	UNABLE TO LOCATE ITEM	One of the following occurred: 1. Item not in AUXUSL for -COPY. 2. Item not in USL for -ADDSL. 3. Item not in USL for -ADDRL. 4. Item not in USL for -HIDE & -REVEAL. 5. Item not in USL for -NEWSEG. 6. Item not in RL for -PURGERL., 7. Item not in USL for -USE.
110	SEGMENT CURRENTLY LOADED	Segment referenced is in use and has been loaded by the loader.
111	SEGMENT CONTAINS EXTERNAL VARIABLE	<i>stringparm</i> is entry name.
112	SEGMENT CONTAINS COMMON	<i>stringparm</i> is entry name.
113	SEGMENT CONTAINS LOGICAL UNITS	FORTTRAN program contains reference to logical units.
120	AUX USL FILE NOT DESIGNATED	Tried to -COPY with no AUXUSL open.
b.	MPE/3000 CONSOLE OPERATOR'S GUIDE Part number 32000-90004	=RESUMEJOB as described in section 3.a of this note.  page 5-3/5-4 The description of =SHOWJOB should be modified to include the new qualifier SUSP as described in section 3.a of this note.
page 5-2	Add description of =BREAKJOB and	

## HP 32213 COBOL-A, HP 32213 COBOL-B

This article, along with the MIT date coded 1537, will comprise the official release of HP 32213.02.02 (COBOL-A) and 01.02 (COBOL-B) COBOL/3000.

1.0 The following problems were corrected in COBOL-A.02.02.

- 1.1 File-name appearing in a SELECT statement but not in a FD in the DATA DIVISION is now diagnosed at compile time.
- 1.2 RENAME (66-level) in the FILE SECTION of the DATA DIVISION resulted in an erroneous error diagnostic and ABORT.
- 1.3 \$EDIT VOID was not executed correctly in case of sequence numbers larger than 300000.
- 1.4 In case of runtime data stacks larger than %40000, numeric-edited operations could be erroneous and destroy data in core.

2.0 The following problems were corrected in COBOL-B.01.02.

- 2.1 Division with operands with scaling position (P) was incorrect in some cases.
- 2.2 Compilation speed has been improved considerably.
- 2.3 File name appearing in a SELECT statement but not in a FD in the DATA DIVISION is now diagnosed at compile time.
- 2.4 RENAME (66-level) in the FILE SECTION of the DATA DIVISION resulted in an erroneous error diagnostic and ABORT.
- 2.5 \$EDIT VOID was not executed correctly in case of sequence numbers larger than 300000.
- 2.6 In case of runtime data-stacks larger than %40000, numeric-edited operations could be erroneous and destroy data in core.

## HP 32215A IMAGE/3000

This article, along with MIT date coded 1537, will comprise the official release of HP 32215A.03.00 IMAGE/3000.

1. There was a bug in DBGET, DBUPDATE, and DBPUT which caused an error to be returned for any numeric LIST parameter consisting of the integer 32 followed by thirty-two legitimate data items numbers. This has been corrected.

2. IMAGE modules which formerly used the CHRONOS intrinsic now make use of the intrinsics CALENDAR and CLOCK to obtain date and time information.

## HP 32211C COMPILER LIBRARY

Version 03.04 of the Compiler Library is being released on the MIT, Date Code 1537.

The following change has been made:

1. An error in INEXT', the internal to ASCII conversion routine, could cause erroneous conversion of the last word of an extended precision floating point number.

## HP 32104A RPG/3000

This article, along with the MIT date coded 1537, will comprise the official release of HP 32104A.01.09 RPG/3000.

Incorporated in this fix level are corrections of the following problems having occurred in the previous release of HP 32104A.01.07. (NO 01.08).

1. Compiler generates wrong branch causing bounds violation at run times.
2. Pre-execution time table whose number of entries per file are not a multiple of number of entries per record will sometimes cause bounds violation at run-time (especially if level breaks or matching records used).
3. DSPLY statement will only accept 24 characters of input — will now accept 31 from system console and record limit for interactive terminal.
4. XFOOT did not align result.
5. Use of sign forcing caused invalid numeric data.
6. On update ADD file RPG was not blanking out buffer before doing ADD field moves.
7. Subscripted variable with edit code on output was truncating integer digits.
8. PAGE fields conditioned by an indicator on output were being treated as a regular output field — now the conditioning indicators determines whether or not to zero out the page field after printing.

## HP 32102A FORTRAN/3000

This article along with the MIT date coded 1537, will comprise the official release of HP 32102A.01.06 FORTRAN/3000.

The following error conditions have been corrected:

1. Use of both INIT option and NOLIST option could cause bad initialization code to be generated.



2. The type checking for certain types of subroutines was set lower than it should have been.
3. When a constant went out of range at the same time a loop was terminated, the TBA linkage was bad.
4. Implied DO's resulted in bad code in certain circumstances.

#### KNOWN PROBLEMS IN VERSION A01.06 OF FORTRAN

1. Very complex branch statements (LOGICAL IFS) can overflow an internal table, resulting in incorrect branches. A FIX requires a redesign of the whole mechanism. A rule of thumb for avoiding this problem is that if you have a hard time understanding the conditional expression, the compiler may be confused too.
2. On occasion the table of unallocated constants will become full in the middle of generating code to evaluate a conditional expression for a logical IF statement. If greater than %77 words of constants are emitted, the indirect cell for the previous branch is not fixed up. This problem is related to the first unresolved problem mentioned above. This problem could be experienced in any situation where very little code is generated relative to the number of constants generated. The problem can usually be worked around by doing anything which will move the conditional branches forward or backward in the code. For example, insertion of a dummy assignment or reshuffling the conditional expression might avoid the problem.
1. CALENDER and CLOCK are called in place of CHRONOS.
2. If the first REPORT statement was "OUT=LP", it caused the following statement to be ignored.
3. Real numbers in a FIND command need not be enclosed in quote (") marks.
4. A FIND CHAIN with a valid detail data set name smaller (in characters) than the master data item name caused an error.
5. Message "BAD FORMAT ON PROCEDURE FILE" has been changed to "OLD FORMAT ON PROCEDURE FILE".
6. A REPORT body with missing Sort statements produced an incorrect error message.
7. The combination "S2, DATE and T2, DATE, 6" reported the DATE value from the wrong record.
8. A "null" Z data type was filled with "\*" instead of "0".
9. Newly created PROC-FILE's EOF incorrectly set, causing file to be initialized when declared a subsequent time.
10. XEQ file remained opened if the file was not ASCII.
11. Unsupported data item types (e.g.K2) in an UPDATE ADD command now generate an error message. If a search or sort item, the ADD will terminate.

### HP32216A QUERY/3000

The article, along with the MIT coded 1537, will comprise the official release of HP 32216A.01.02 QUERY/3000.

Incorporated in this fix level is the correction of the following problems having occurred in the previous release of HP 32216A.01.01.

### HP 32226A CROSS LOADER

This article, along with the MIT date coded 1537, will comprise the official release of HP 32226A.00.03 CROSS LOADER (XL2100).

An address in the loader symbol table was being negated in a seemingly random fashion. This has been fixed.

No manual changes.

# documentation

The following tables list all currently available HP 3000 software manuals. This list supersedes the previous list in the **Communicator**. Copies of manuals and update packages can be obtained from your local Sales and Service Office. The address and telephone number of the office nearest to you are listed in the back of all reference manuals.

Customers in the U.S. may also order directly by mail.

Simply list the name and part number of the manuals you need on the Corporate Parts Center form supplied at the back of the **Communicator**. If you require an update package (the items marked N/C in the tables) send your request to:

Software/Publications Distribution  
11000 Wolfe Road  
Cupertino, Ca. 95014

## MPE/3000 MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
03000-90096	Multiprogramming Executive General Information Manual	\$ 4.00	11/73	
32000-90002	32000C MPE/3000 Reference Manual	19.50	1/75	
32000-90004	32000C MPE/3000 Console Operator's Guide	7.00	1/75	
32000-90006	32000C MPE/3000 System Manager/System Supervisor Manual	13.00	1/75	6/75

## LANGUAGE MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
03000-90002	SPL/3000 Reference Manual	\$ 7.50	11/73	
03000-90003	SPL/3000 Textbook	25.00	11/73	3/75
	SPL/3000 Textbook Update Package #1	N/C		
03000-90008	BASIC/3000 Interpreter Reference Manual	10.00	7/73	10/74
03000-90014	COBOL/3000 (Version A) Reference Manual	13.00	9/73	11/73
03000-90025	BASIC for Beginners	5.50	11/72	
03000-90047	Cross Assembler for 2100 Computers Reference and Application Manual	17.00	3/75	
03000-90050	HP 32101A BASIC/3000 Interpreter Pocket Guide	2.50	9/74	
32102-90001	FORTTRAN/3000 Reference Manual	13.50	6/75	
32103-90001	BASIC/3000 Compiler Reference Manual	3.50	11/74	
32104-90001	RPG/3000 Compiler Reference and Application Manual	22.00	2/75	
32104-90003	RPG Listing Analyzer	0.50	4/75	
32213-90001	COBOL/3000 (Version B) Reference Manual	12.50	10/74	

## ADDITIONAL MANUALS

PART NUMBER	MANUAL TITLE	PRICE	DATE	UPDATE
03000-90009	HP 3000 Compiler Library Reference Manual	\$10.00	9/73	11/73
03000-90010	HP 3000 Scientific Library Reference Manual	5.00	11/72	
03000-90011	STAR/3000 (Statistical Analysis Routines) Reference Manual	5.50	11/72	
03000-90012	EDIT/3000 Reference Manual	7.50	8/75	
03000-90015	HP 3000 Symbol Trace Reference Manual	4.00	2/74	
03000-90019	HP 3000 Computer Systems Reference Manual	14.00	9/73	
03000-90064	FCOPY/3000 Reference Manual	6.00	3/75	6/75
03000-90107	HP 3000 Cross Loader for HP 2100 Computers	11.00	10/74	
03000-90121	A Guide for the Terminal User	7.50	6/75	
30130-90001	2780/3780 Emulator Subsystem Reference and Application Manual	10.00	12/74	
30300-90002	HP 30300A Programmable Controller Reference and Application Manual	12.00	2/75	
32215-90001	IMAGE/3000 Reference Manual	7.00	4/75	
32216-90001	QUERY/3000 Reference Manual	7.00	3/75	
32900-90001	Student Information System Reference Manual	18.00	3/75	
32900-90002	Student Information System — System Overview	7.00	9/74	
32900-90005	Student Information System — Technical Manual	18.50	3/75	
32901-90001	Student Assignment System — Reference Manual	10.00		
32901-90005	Student Assignment System — Technical Manual	13.00		
36995-90013	IBM 1130/1800 to HP 3000 FORTRAN Conversion Guide	6.00	2/75	5/75
32214-90001	32214B Sort/3000 Reference Manual	6.50	4/75	

# training schedule

The schedule for software training courses related to the HP 3000 is provided below. Included are courses scheduled for the next three months (October through December).

Each issue of the **Communicator** will provide timely information on training to assist you in registering for classes applicable to the operation of your system.

## SOFTWARE COURSES

COURSE NUMBER	PRODUCT	COURSE LENGTH	DATES	LOCATION
22962A	3000 Commercial/Business User	5 Days	Oct 20-24 Oct 20-24 Nov 3-7 Dec 1-5	Cupertino Rockville Cupertino Rockville
22963A	3000 Scientific/Engineering User	5 Days	Oct 6-10 Nov 17-21 Dec 8-12	Cupertino Rockville Cupertino
22964A	3000 System Management	3 Days	Oct 13-15 Oct 27-29 Nov 10-12 Nov 24-26 Dec 8-10 Dec 15-17	Cupertino Rockville Cupertino Rockville Rockville Cupertino
22956A	3000 Image	5 Days	Oct 27-31 Nov 17-21 Dec 15-19	Cupertino Cupertino Rockville
22974A	Minicomputers in Manufacturing	2 Days	Oct 16-17 Nov 24-25	Cupertino Cupertino
22975A	System 3 Conversion Seminar	2 Days	Nov 13-14 Dec 11-12	Cupertino Rockville

## HP Training Centers

Training is conducted in the U.S.A. at facilities in Cupertino, California and Rockville, Maryland.

Each Training Center is staffed with professional instructors. Courses are designed such that the student will receive both classroom instruction and practical, hands-on experience. By attending the courses in the recommended sequence for your particular HP system, the student will gain the most beneficial training available to meet the needs of your specific application.

## Registration

Requests for enrollment in an HP Training Course should be made through your local HP representative. He will supply the Training Registrar at the appropriate location with the course number, dates, and requested motel reservations. Enrollments are acknowledged by a written

confirmation indicating the Training Course, time of class, location and accommodations reserved.

## Accommodations

Students provide their own transportation, meals, and lodging. The Training Registrar will be pleased to assist in securing motel reservations at the time of registration.

## Cancellations

In the event you find you cannot attend a particular class we would appreciate your prompt notification.

## Eastern Training Center

Hewlett-Packard  
4 Choke Cherry Road  
Rockville, Maryland 20850  
(301) 948-6370

## Western Training Center

Hewlett-Packard  
11000 Wolfe Road  
Cupertino, California 95014  
(408) 257-7000

# subscription information

The **Communicator** has been inaugurated with three widely distributed Preview Issues during the period June through October, 1975. Our intention has been to acquaint the large number of potential subscribers with the availability of this new customer support publication.

Subsequent issues of the **Communicator** will be distributed on a subscription basis. An annual subscription consisting of 8 issues, beginning November 1975, will be offered as outlined below.

## I. CUSTOMERS WITH SOFTWARE MAINTENANCE AGREEMENTS OR SOFTWARE SUBSCRIPTION SERVICE AGREEMENTS (SOFTWARE SERVICE CONTRACT SUBSCRIPTIONS)

All Hewlett-Packard customers with Software Service Contracts are entitled to one BASE SUBSCRIPTION (1 copy per issue) at no additional charge. These customers may also buy ADDITIONAL SUBSCRIPTIONS whose purchase price is to be prorated against the remaining life of their Software Service Contract. A proration table appears on the ORDER FORM which is bound into this issue.

To receive a BASE SUBSCRIPTION at no charge as well as to purchase ADDITIONAL SUBSCRIPTIONS under the provisions of the Software Service Contract Program, complete the ORDER FORM and forward it to your local HP Sales and Service Office. Your local Customer Engineer will validate your order and mail it to the appropriate HP department.

Rates:

	U.S.A.	NON-U.S.A.
BASE SUBSCRIPTION	NAC*	NAC*
ADDITIONAL SUBSCRIPTIONS (ea.)	\$12/yr.	**

- 1) ADDITIONAL SUBSCRIPTIONS must go to the same address as the BASE SUBSCRIPTION to qualify for the reduced rates.
- 2) ADDITIONAL SUBSCRIPTIONS ordered at a later date than the BASE SUBSCRIPTION must include, with the order form, a copy of the address label for proper identification.
- 3) Charges for ADDITIONAL SUBSCRIPTIONS will be prorated to expire with your Software Service Contract.

\*No Additional Charge (NAC)

\*\*Contact your local HP Customer Engineer for the price in the currency of your country.

- 4) Orders for ADDITIONAL SUBSCRIPTIONS from a customer with a Software Service Contract will be verified by the Customer Engineer who will complete the "FOR HP USE ONLY" portion of the subscription form and direct the order to the appropriate HP department. The customer will be billed by his local HP Customer Engineering Department.

## II. CUSTOMERS WITHOUT SOFTWARE MAINTENANCE AGREEMENTS OR SOFTWARE SUBSCRIPTION SERVICE AGREEMENTS (MAIL ORDER SUBSCRIPTIONS)

Rates:

	U.S.A.	NON-U.S.A.
BASE SUBSCRIPTION	\$48/yr.	***
ADDITIONAL SUBSCRIPTIONS (ea.)	\$12/yr.	***

- 1) ADDITIONAL SUBSCRIPTIONS must be ordered at the same time as the BASE SUBSCRIPTION and go to the same address as the BASE SUBSCRIPTION to qualify for the reduced rate.
- 2) The customer is to include payment (check, bank draft, money order, etc.) with the order. This is a Direct Mail Order procedure; please do not send a purchase order to HP.
- 3) Complete the ORDER FORM as directed and mail together with your payment to:

Hewlett-Packard Co.  
Mail Order Department  
P.O. Drawer #20  
Mountain View, California 94043  
U.S.A.

## SUBSCRIPTION CORRESPONDENCE

Address all correspondence relating to **COMMUNICATOR** subscriptions to:

Subscription Service Manager  
Hewlett-Packard Company  
Corporate Parts Center  
333 Logue Avenue  
Mountain View, California 94043  
U.S.A.

\*\*\*The international customer is encouraged to also use HP's Direct Mail Order System by remitting a bank draft in U.S. dollars according to the order procedure outlined above. If the currency regulations in the customer's country disallow the purchase of bank drafts in American dollars, or if the customer does not have ready access to the required banking services, the customer may order subscriptions from the local HP Sales and Service Office through his Customer Engineer. The customer should contact his HP Office for the price of the subscription in the currency of his country, then complete the ORDER FORM and forward it together with payment to his local HP office.